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A 40-year-old patient has been complaining of headache, weakness, dizziness, pruritus and weight loss. His laboratory results show erythrocytosis, leukocytosis, thrombocytosis and a very low erythropoietin level.

Apart from thrombosis, which one of the following is the major complication of this disease?

A	Bleeding
B	Fractures
C	Hepatic failure
D	Renal failure
E	Respiratory failure

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Previous Question | Skip Question

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4:33
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Explanation

A	Bleeding

This man has primary polycythaemia. Bleeding and thrombosis are the major complications of this condition. Peptic ulcer disease can occur and contributes to gastrointestinal bleeding. Thrombosis can either be venous or arterial in nature.

D	Renal failure

Renal failure is incorrect. Renal failure is not a feature of primary polycythaemia.

B	Fractures

Fractures is incorrect. Fractures are not a common feature or complication of this disease.

C	Hepatic failure

Hepatic failure is incorrect. Hepatic failure is not a feature of primary polycythaemia.

E	Respiratory failure

Respiratory failure is incorrect. Respiratory failure is not a feature of primary polycythaemia.

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4:33
٠٥:٣٣ 3G

A 62-year-old patient with a progressive autoimmune disease is going to be started on cyclophosphamide.

Which one of the following is the most likely side effect?

A	Gingival hyperplasia
B	Haemorrhagic cystitis
C	Hirsutism
D	Thrombocytopaenia
E	Weight gain

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Explanation

D Thrombocytopaenia

The most common side effects of cyclophosphamide includeanaemia, neutropenia and thrombocytopaenia, and therefore regular monitoring of the full blood count is recommended for patients taking cyclophosphamide.

B Haemorrhagic cystitis

Haemorrhagic cystitis is incorrect. Haemorrhagic cystitis usually only occurs when given in high doses via the intravenous route. Doses used to treat auto-immune disease would be much smaller, and therefore would not pre-dispose to this risk very greatly.

A Gingival hyperplasia

Gingival hyperplasia is incorrect. Gingival hyperplasia is a side effect of ciclosporin.

C Hirsutism

Hirsutism is incorrect. Hirsutism is a side effect of ciclosporin.

E Weight gain

Weight gain is incorrect. Weight gain is not a likely side effect of cyclophosphamide.

#8293

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4:34
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A 62-year-old woman is sent to you for review. There is a history of long-standing rheumatoid arthritis for which she takes NSAIDs and sulfasalazine. Examination reveals changes consistent with rheumatoid arthritis and a palpable spleen. Her blood picture reveals mild anaemia, neutropaenia and a platelet count of 74×10^9 ($(150–400) \times 10^9$). Bone marrow biopsy reveals an excess of immature granulocyte precursors. Autoimmune screen reveals a raised ESR, positive rheumatoid factor, positive ANA and antihistone antibody.

What diagnosis fits best with this clinical picture?

A	Amyloidosis
B	Felty syndrome
C	Lymphoma
D	Myelofibrosis
E	Portal hypertension with splenomegaly

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Previous Question Skip Question

Calculator

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Explanation

B	Felty syndrome

Felty syndrome is defined as the triad of rheumatoid arthritis,splenomegaly and a low white cell count. This is the clinical picture presented here.

A	Amyloidosis

Amyloidosis is incorrect. Clinical symptoms of amyloidosis include diarrhoea, heart failure and other symptoms that may be associated with an underlying plasma cell dyscrasia such as bone pain. None of these features is present in this lady.

C	Lymphoma

Lymphoma is incorrect. There is nothing on clinical examination to suggest lymphoma, such as the development of lymphadenopathy.

D	Myelofibrosis

Myelofibrosis is incorrect. Myelofibrosis would not tie in with this lady's history of rheumatoid arthritis.There is no mention that the bone marrow biopsy has shown increased fibrosis, which is typically found in patients with myelofibrosis.

E	Portal hypertension with splenomegaly

Portal hypertension with splenomegaly is incorrect. Portal hypertension with splenomegaly would not tie in with the long-standing history of rheumatoid arthritis, and there is no other reason why this lady may have developed portal hypertension.

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A 35-year-old woman had a bone marrow transplant, for acute myeloid leukaemia in second remission, 14 days ago from her HLA-identical sibling. She has been pyretic for the last 3 days and is on second-line antibiotics. Nothing has been grown in blood cultures. Over the last 48 hours she has developed tenderness in the right hypochondrium, jaundice and has gained 6 kg in weight. Her liver function tests have been deteriorating and are now AST 205 U/l, ALT 134 U/l, ALP 95 U/l, bilirubin 184 µmol/l, LDH 850 U/l.

Which one of the following is the most likely cause of her hepatic dysfunction?

A	Acute graft-versus-host disease
B	Ciclosporin toxicity
C	Infectious hepatitis
D	Invasive aspergillosis
E	Veno-occlusive disease

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Previous Question Skip Question

Calculator

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4:37
3G

E	Veno-occlusive disease

This patient has developed right upper quadrant pain, jaundice and weight gain, associated with abnormal liver function. This presentation is typical of veno-occlusive disease of the liver when there is occlusion of the central veins and small venules of the liver. This can be can be diagnosed by Doppler ultrasound.

A	Acute graft-versus-host disease

Acute graft versus host disease is incorrect. This presents with liver abnormalities, significant diarrhoea and skin changes. There is no mention of skin changes or diarrhoea in this situation.

B	Ciclosporin toxicity

Ciclosporin toxicity is incorrect. It can cause renal impairment in the post-transplant phase but does not tend to cause liver problems.

C	Infectious hepatitis

Infectious hepatitis is incorrect. Infectious hepatitis is always a possibility in immunocompromised patients, but a clinical triad of jaundice, ascites and weight gain is typical of veno-occlusive disease of the liver.

D	Invasive aspergillosis

Invasive aspergillosis is incorrect. This can cause sinus pain and obstruction, as well as invading the lungs and causing pneumonia. This often presents with negative blood cultures despite broad spectrum antibiotics. However, the clinical presentation is not of invasive aspergillosis.

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4:39
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there is occlusion of the central veins and small venules of the liver. This can be can be diagnosed by Doppler ultrasound.

A	Acute graft-versus-host disease

Acute graft versus host disease is incorrect. This presents with liver abnormalities, significant diarrhoea and skin changes. There is no mention of skin changes or diarrhoea in this situation.

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You review a 67-year-old man who has suffered from severe weight loss over the past few weeks. He also has epigastric pain that radiates to his back. On examination he is jaundiced and you wonder about a mass in the epigastrium. Your laboratory is able to check his tumour marker status, and you find a raised CA-19-9 result.

Which one of the following is the most likely source of his cancer?

A	Colon
B	Liver
C	Lung
D	Pancreas
E	Stomach

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Previous Question | Skip Question

Calculator

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4:39
3G

D	Pancreas

CA-19-9 is particularly raised in pancreatic cancer, although it may be raised in other gastrointestinal neoplasms (including gastric) and benign pancreatic pathology. Given this patient's history, including classical features such as jaundice and pain radiating to the back, the most likely primary source is a pancreatic tumour.

Other tumour markers include:

- α-fetoprotein (associated with hepatocellular (liver) carcinoma and non-seminomatous germ-cell tumours)
- β-human chorionic gonadotrophin (associated with choriocarcinomas and germ-cell tumours)
- Prostate-specific antigen (associated with prostatic carcinoma)
- CEA (associated with gastrointestinal cancers including colon and gastric cancer)
- CA-125 (associated with ovarian cancer)
- CA-15-3 (associated with breast cancer)

No specific circulating tumour markers are associated with lung cancer. It should be noted that none of these markers has 100% specificity for cancer, and all are normally used as an adjunct to monitoring of cancer status, rather than for diagnosis.

A	Colon

Colon is incorrect. CEA not CA19-9 is associated with gastrointestinal cancers including colon and gastric cancer.

B	Liver

Liver is incorrect. α-fetoprotein not CA19-9 is associated with hepatocellular (liver) carcinoma.

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A relative of a patient of yours who has metastatic cancer asks your opinion about a cancer treatment that works by cutting off the tumour blood supply.

He is referring to which group of drugs?

A	Angiogenesis inhibitors
B	Interferons
C	Matrix metalloproteinase inhibitors
D	Monoclonal antibodies
E	Taxanes

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Previous Question Skip Question

Calculator

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Explanation

A	Angiogenesis inhibitors

The answer is Angiogenesis inhibitors (Option A).

Angiogenesis inhibitors have been shown to treat cancer by halting tumour growth and stopping the formation of new blood vessels in these tumours. For a tumour to grow, it must first induce the creation of new blood vessels by a process called 'angiogenesis'; if this is halted then the tumour cannot expand. The most widely used angiogenesis inhibitor, bevacizumab, is a vascular endothelial growth factor (VEGF) inhibitor and is used in the management of colorectal cancer.

B	Interferons

Interferons (Option B) is incorrect. Interferons are used in immunotherapy for certain cancers such as kidney cancer and myeloma. The main side-effects are malaise and flu-like symptoms.

C	Matrix metalloproteinase inhibitors

Matrix metalloproteinases (Option C) is incorrect. Matrix metalloproteinases inhibit the proteases that cancer cells produce to facilitate detachment from the primary tumour, invasion of the bloodstream and growth at distant sites. They are currently being tested in clinical trials.

D	Monoclonal antibodies

Monoclonal antibodies (Option D) is incorrect. Monoclonal antibodies are artificial antibodies against a particular target (the antigen), for example trastuzumab targets the HER-2 receptor, which is upregulated in some breast cancers.

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E	Taxanes

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C Matrix metalloproteinase inhibitors

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D Monoclonal antibodies

Monoclonal antibodies (Option D) is incorrect. Monoclonal antibodies are artificial antibodies against a particular target (the antigen), for example trastuzumab targets the HER-2 receptor, which is upregulated in some breast cancers.

E Taxanes

Taxanes (Option E) is incorrect. Taxanes are well-established chemotherapeutic agents that block cell division by inhibiting formation of the mitotic spindle. Taxanes are used extensively in the treatment of breast and ovarian cancer.

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A 38-year-old man presents to the Emergency Department with rapidly worsening shortness of breath, extreme lethargy and jaundice. He has recently begun a course of primaquine prior to travelling to the Far East for a holiday. On examination he looks pale and jaundiced, his BP is 110/60 mmHg, pulse is 95/min and regular. There are bilateral crackles on auscultation of the chest.

Which of the following would you expect to see on examination of the blood film?

A	Heinz bodies
B	Inclusion bodies
C	Lewy bodies
D	Promyelocytes
E	Spindle cells

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Previous Question | Skip Question

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Explanation

A	Heinz bodies

This man is pale and jaundiced, and this combination suggests haemolytic anaemia following introduction of a course of primaquine. This suggests therefore that he could possibly be G6PD deficient. Heinz bodies are denatured haemoglobin which can be visualised within red cells on blood film examination.

B	Inclusion bodies

Inclusion bodies is incorrect. Inclusion bodies are aggregations of protein found within the nucleus or cytoplasm of cells.

C	Lewy bodies

Lewy bodies is incorrect. Lewy bodies are aggregations of proteins seen in degenerative neurones found in Lewy body dementia.

D	Promyelocytes

Promyelocytes is incorrect. Promyelocytes are immature white cells.

E	Spindle cells

Spindle cells is incorrect. Spindle cells are seen in solid tumours.

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A 72-year-old man presents with headaches, itching and weight loss. He is a non-smoker with a history of mild hypertension treated with amlodipine 10 mg. On examination his BP is 166/98 mmHg, and he looks plethoric. There is hepatosplenomegaly on abdominal examination.

Investigations:

Hb	202 g/l
WCC	14.2 x 10^9/l
PLT	630 x 10^9/l
Haematocrit	0.55 (0.40-0.52)
Visc	2.8 mPa/s (1.50-1.72)
Neutrophil alkaline phosphatase	Elevated

Which one of the following is the most likely diagnosis?

A	Chronic lymphocytic leukaemia
B	Chronic myeloid leukaemia
C	Essential thrombocythaemia
D	Primary polycythaemia
E	Secondary polycythaemia

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Explanation

D	Primary polycythaemia

Primary polycythaemia is the most likely diagnosis. This man has a raised haemoglobin level associated with a raised haematocrit. The white cell count and platelet count are also slightly elevated. He has symptoms of primary polycythaemia, namely headaches and itching. Erythropoietin levels are usually reduced, and there is a mutation in the JAK2 gene in primary polycythaemia in more than 95% of patients.

E	Secondary polycythaemia

Secondary polycythaemia is incorrect. Secondary polycythaemia would be unlikely to cause the symptoms associated with primary polycythaemia, and would not result in hepatosplenomegaly. It would not be associated with other myeloproliferative indices, such as a raised platelet count or white cell count.

A	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. There is nothing to suggest chronic lymphocytic leukaemia in the question such as lymphadenopathy. The white cell count is only marginally raised. There is no suggestion of a lymphocytosis in the question, and chronic lymphocytic leukaemia would not be associated with a raised haematocrit or a raised platelet count.

B	Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. Although chronic myeloid leukaemia can cause symptoms associated with a myeloproliferative disorder such as weight loss and headaches, the white cell count is only very marginally elevated. The white cell count is very significantly raised, usually greater than 100 or even 200. Chronic myeloid leukaemia would not be associated with

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would not be associated with other myeloproliferative indices, such as a raised platelet count or white cell count.

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C	Essential thrombocythaemia

Essential thrombocythaemia is incorrect. Essential thrombocythaemia would not be associated with a raised haematocritor haemoglobin.

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A 78-year-old woman on prophylactic subcutaneous low molecular weight heparin 7 days after hip-replacement surgery develops a large erythematous raised area around the heparin injection site in her right arm. The following day this has enlarged, has a black necrotic centre, and a full blood count check reveals a platelet count of only 33. Further tests show a positive antibody test for platelet factor 4–heparin complex antibodies, which confirms the diagnosis of heparin-induced thrombocytopenia type 2.

Which one of the following is the most appropriate next line of management?

A	Change to an alternative form of low molecular weight heparin
B	Stop heparin and commence a non-heparinoid based anticoagulant
C	Stop heparin and commence warfarin
D	Stop heparin and observe
E	Stop low molecular weight heparin and maintain on an unfractionated heparin infusion

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Explanation

B	Stop heparin and commence a non-heparinoid based anticoagulant

We are told that this lady has evidence of a falling platelet count, and antibody tests which confirm heparin-induced thrombocytopenia. She has a necrotic area at the heparin injection site, and this is skin necrosis. This results from thrombosis in arteries that supply cutaneous tissues and is a warning of possible systemic thrombosis. Therefore, the low molecular weight heparin should be stopped, and an alternative anticoagulant that is non-heparin based should be commenced.

A	Change to an alternative form of low molecular weight heparin

Change to an alternative form of low molecular weight heparin is incorrect. This thrombotic phenomenon is a class effect, and will continue if one switches simply to an alternative low molecular weight heparin.

C	Stop heparin and commence warfarin

Stopping heparin and commencing warfarin is not enough. It will take a number of days for the patient to be therapeutically anticoagulated with warfarin, and during this time, the patient will be at significant risk of a systemic thrombosis. Therefore, the patient should be placed on an alternative anticoagulant, and then, when stabilised, commenced on warfarin in addition. Once the INR is greater than 2.0, the alternative anticoagulant can be stopped.

D	Stop heparin and observe

Stop heparin and observe is incorrect. Stopping heparin and observi[illegible]o insufficient. The patient is at risk of systemic thrombosis, and simply stopping the heparin will not take this risk away. Therefore, an alternative anticoagulant needs to be

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A 78-year-old woman on prophylactic subcutaneous low molecular weight heparin 7 days after hip-replacement surgery develops a large erythematous raised area around the heparin injection site in her right arm. The following day this has enlarged, has a black necrotic centre, and a full blood count check reveals a platelet count of only 33. Further tests show a positive antibody test for platelet factor 4–heparin complex antibodies, which confirms the diagnosis of heparin-induced thrombocytopenia type 2.

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C	Stop heparin and commence warfarin
D	Stop heparin and observe
E	Stop low molecular weight heparin and maintain on an unfractionated heparin infusion

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A 64-year-old male heavy smoker is admitted to hospital with haemoptysis. Routine laboratory tests reveal a blood calcium level of 3.21 mmol/l (2.2–2.6).

Which one of the following is the probable underlying cause of his presentation?

A	Large-cell lung cancer
B	Sarcoid
C	Small-cell lung cancer
D	Squamous-cell lung cancer
E	Tuberculosis

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Previous Question | Skip Question

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Explanation

D	Squamous-cell lung cancer

Squamous-cell lung carcinomas make up around 25–30% of all lung cancers and are associated with PTHrp production, causing hypercalcaemia. Squamous-cell lung cancer also commonly metastasises to bone (as does thyroid, breast and prostate cancer and lymphomas), which may cause hypercalcaemia.

A	Large-cell lung cancer

Large-cell lung cancer is incorrect. Large-cell lung cancer comprises a group of subtypes of tumour, the most significant of which is large-cell neuroendocrine tumours. These may cause hypercalcaemia but are significantly rarer than squamous-cell lung cancer.

B	Sarcoid

Sarcoid is incorrect. Sarcoidosis is a granulomatous disease which is associated with hypercalcaemia but is usually diagnosed between 20 and 40 years of age and is not smoking related, therefore less likely in this scenario.

C	Small-cell lung cancer

Small-cell lung cancer is incorrect. Small-cell lung cancer may also metastasise to bone causing hypercalcaemia, but it is a rarer feature than in squamous-cell lung cancer.

E	Tuberculosis

Tuberculosis is incorrect. Tuberculosis is false as it rarely causes hyperca a.

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A 24-year-old comes to the clinic with mild haemophilia A. He normally uses desmopressin (1-deamino-8-d-arginine vasopressin (DDAVP)) prior to taking part in physical exercise. Investigations:

Hb	130 g/l
WCC	6.9×10^9/l
PLT	191×10^9/l
Na^+	138 mmol/l
K^+	4.1 mmol/l
Creatinine	110 µmol/l

Which one of the following correctly describes the function of DDAVP in the treatment of haemophilia A?

A Activation of factor VIII

B Activation of factor IX

C Generate new factor VIII

D Generate new von Willebrand's factor

E Release pre-formed von Willebrand's factor

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E Release pre-formed von Willebrand's factor

DDAVP leads to this release, which complexes with factor VIII to prolong factor VIII survival.

A Activation of factor VIII

Activation of factor VIII is incorrect. DDAVP does not do this, DDAVP works by enhancing release of pre-formed von Willebrand factor.

B Activation of factor IX

Activation of factor IX is incorrect. This is not the missing coagulation factor in haemophilia A.

C Generate new factor VIII

Generate new factor VIII is incorrect. DDAVP works by enhancing release of pre-formed von Willebrand factor, not generating new factor VIII.

D Generate new von Willebrand's factor

Generate new von Willebrand's factor is incorrect. DDAVP works by enhancing release of pre-formed von Willebrand factor, not by generating new von Willebrand factor.

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A 55- year-old female with colon cancer has a tumour classified as 'R2'.

What does the R2 classification stand for in cancer therapy?

A	Lymph-node involvement
B	Metastases present
C	The tumour was macroscopically visible but could not be removed completely
D	Tumour size 2 cm
E	Well-differentiated tumour

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Previous Question Skip Question

Calculator

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C	The tumour was macroscopically visible but could not be removed completely

The following residual tumour (R) classification exists in addition to the TNM classification and the histological grade (G):

- RX presence of residual tumour cannot be assessed
- R0 no residual tumour
- R1 microscopic residual tumour
- R2 macroscopic residual tumour.

Tumour size, lymph node involvement and metastasis presence are indicated by the T, N and M classifications, respectively.

D	Tumour size 2 cm

Tumour size is incorrect. Tumour size is indicated by the T classification.

A	Lymph-node involvement

Lymph-node involvement is incorrect. Lymph node involvement is indicated by the N classification.

B	Metastases present

Metastases present is incorrect. Metastasis presence is indicated by the M classification.

E	Well-differentiated tumour

Well-differentiated tumour is incorrect. Tumour differentiation is included in grading classification rather than staging.

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A 70-year-old man who is a smoker of ten cigarettes per day presents to the GP. He has suffered increasing attacks of angina over the past few months and has noticed that he is getting some large bruises on his arms and legs. A history of gout is also noted. Most recently he was admitted to the Emergency Ward of the local hospital with a right-sided deep vein thrombosis.

Investigations:

Hb	195 g/l
WCC	9.2×10^9/l
PLT	640×10^9/l
Na^+	139 mmol/l
K^+	5.4 mmol/l
Creatinine	135 µmol/l

You arrange further investigations including erythropoietin (EPO) levels and arterial blood gases.

Which one of the following would be the strongest pointer towards primary polycythaemia?

A	History of sleep apnoea
B	Hypochromic red blood cells
C	Low EPO level
D	Slightly decreased PaO2
E	increased PaCO2

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Explanation

C	Low EPO level

Low EPO levels will be the strongest pointer towards primary polycythaemia. In this condition, there is a myeloproliferative disorder. There is increased red blood cell production by the marrow, which then turns off endogenous EPO production. This means that there should be a low EPO level.

A	History of sleep apnoea

History of sleep apnoea is incorrect. A history of sleep apnoea would point perhaps more towards a secondary polycythaemia.

B	Hypochromic red blood cells

Hypochromic red blood cells is incorrect. Hypochromic red blood cells will not help distinguish between either primary or secondary polycythaemia.

D	Slightly decreased PaO2

Slightly decreased PaO2 is incorrect. Slightly decreased pCO2 levels will not be helpful in distinguishing between primary and secondary polycythaemia.

E	Slightly increased PaCO2

Slightly increased PaCO2 is incorrect. Slightly increased pCO2 levels might suggest type II respiratory failure and secondary polycythaemia. In this condition, however, one would therefore expect there to be a hypoxic drive that would increase endogenous EPO levels, causing the secondary polycythaemia.

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A 24-year-old patient with a diagnosis of acute myeloid leukaemia is admitted to the oncology ward for induction chemotherapy. Investigations:

Hb	8.1 g/dl
WCC	72.1 x 109/l
PLT	78 x 109/l
Na+	138 mmol/l
K+	4.9 mmol/l
Creatinine	132 micromol/l
LDH	930 U/l
Urate	820 micromol/l

Which of the following is the most appropriate intervention to prevent urate nephropathy?

A	Allopurinol
B	Colchicine
C	Diclofenac
D	IV Rasburicase
E	Prednisolone

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D	IV Rasburicase

IV rasburicase is the most appropriate intervention to prevent urate nephropathy. Rasburicase breaks down uric acid into allantoin. It should be noted that this enzyme is not normally present in humans.

A	Allopurinol

Allopurinol is incorrect. This man has a high white cell count with pre-existing renal impairment. Allopurinol works by inhibiting the conversion of xanthine to uric acid by the enzyme xanthine oxidase. However, rasburicase is a more potent drug to prevent tumour lysis syndrome and is certainly preferred in this situation when the white cell count is so high.

B	Colchicine

Colchicine is incorrect. Colchicine can be used to treat gout, but has no role in preventingtumour lysis syndrome.

C	Diclofenac

Diclofenac is incorrect. Diclofenac can be used to treat gout symptomatically but it doesnot have any role in preventing tumour lysis syndrome.

E	Prednisolone

Prednisolone is incorrect. Prednisolone has no role in the prevention of tumour lysis syndrome. Of course, this may have a role in the treatment of acute gout.

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You are asked to see a 24-year-old man on the Oncology Ward who began treatment for Burkitt's lymphoma some 3 days earlier. He has begun vomiting over the past 2–3 h and has now begun complaining of pins and needles in his hands and distal spasms. He looks unwell, his BP is 105/60 mmHg, pulse is 105/min and regular. You notice peripheral oedema on examination of both lower limbs and crackles on auscultation of the chest. Investigations:

Hb	100 g/l
WCC	14.9 x 10^9/l
PLT	181 x 10^9/l
Na^+	138 mmol/l
K^+	6.5 mmol/l
Bicarbonate	16 mmol/l
Creatinine	160 micromol/l
Ca^{++}	2.05 mmol/l
Albumin	30 g/l
ALT	130 U/l
LDH	830
ECG	Sinus tachycardia with hyperacute T waves

Which of the following is the most important next step?

A IV calcium gluconate

B IV insulin and dextrose

C IV normal saline

D Oral calcium resonium

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4:53
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A	IV calcium gluconate

IV calcium gluconate is the next most important step in this young man's management. He has evidence of renal impairment and hyperkalaemia. There are significant ECG changes, consequent upon the hyperkalaemia. Therefore urgent treatment of the hyperkalaemia is indicated with intravenous calcium gluconate. It is likely this man has developed tumour lysis syndrome as a consequence of his recent chemotherapy, resulting in hyperkalaemia, hypocalcaemia and high phosphate levels.

B	IV insulin and dextrose

IV insulin and dextrose is incorrect. IV insulin and dextrose will also be an important adjunctive therapy for his hyperkalaemia, in addition to the calcium gluconate, but the calcium gluconate is the more pressing treatmentgiven his ECG changes.

C	IV normal saline

IV normal saline is incorrect. This man has life-threatening hyperkalaemia, and just giving some normal saline will not rectify this.

D	Oral calcium resonium

Oral calcium resonium is incorrect. This can be used as an adjunct to the above measures to reduce potassium absorption from the bowel, but this is too slow acting to be useful when there are ECG changes associated with hyperkalaemia.

E	Referral for haemofiltration

Referral for haemofiltration is incorrect. Referral for haemofiltration may be required, but this should not stop the important steps of giving IV calcium gluconate, followed by intravenous insulin a dextrose.

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A 57-year-old man complains of nausea, abdominal pain and fatigue. Screening blood tests indicate hypercalcaemia. He is referred to hospital and cross-sectional imaging demonstrates metastatic malignancy of uncertain origin. No obvious bony metastases are demonstrated.

Hypercalcaemia in malignant disease secondary to the secretion of parathyroid hormone related peptide (PTHrP) by the tumour is most frequently associated with which one of the following?

A	Carcinoid tumours
B	Lymphoma
C	Multiple myeloma
D	Small-cell carcinoma of the bronchus
E	Squamous-cell carcinoma of the bronchus

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Previous Question | Skip Question

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4:54
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Explanation

E	Squamous-cell carcinoma of the bronchus

Hypercalcaemia is a frequent complication of cancer, and is frequently the result of the secretion of parathyroid hormone related peptide (PTHrP). Squamous cell carcinomas of the bronchus are most frequently responsible, although hypercalcaemia is not uncommon with other bronchogenic cancers (including small-cell carcinoma, option D). PTHrP simulates most of the actions of PTH, including increases in bone resorption and distal tubular calcium reabsorption, and inhibition of proximal tubular phosphate transport. However, it does not increase intestinal calcium absorption.

A	Carcinoid tumours

Carcinoid tumours is incorrect. Carcinoid tumours sometimes secrete vasopressin or ACTH, but rarely cause hypercalcaemia.

B	Lymphoma

Lymphoma is incorrect. In lymphomas unregulated extrarenal production of calcitriol can be responsible.

C	Multiple myeloma

Multiple myeloma is incorrect. In myeloma the secretion of osteoclast activating cytokines is the usual cause of hypercalcaemia.

D	Small-cell carcinoma of the bronchus

Small-cell carcinoma of the bronchus is incorrect. Small-cell carcinoma of the bronchus may be associated with hypercalcaemia.

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Audio
Video
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Participants
More

Therapeutic plasmapheresis is considered MOST effective in which one of the following types of haemolyticanaemia?

A	Haemolytic anaemia associated with *Mycoplasma pneumoniae*
B	Thalassaemia major
C	Systemic lupus erythematosus(SLE) associated haemolytic anaemia
D	Paroxysmal nocturnal haemoglobinuria (PNH)
E	Aplastic anaemia

Submit

Previous Question | Skip Question

Calculator

Normal Values

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4:55
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A	Haemolytic anaemia associated with *Mycoplasma pneumoniae*

Haemolytic anaemia associated with *Mycoplasma pneumoniae* is the most effective use of therapeutic plasmapheresis. Mycoplasma pneumonia can induce cold agglutinins that are IgM antibodies;these can then go on to cause auto-immune haemolytic anaemia. It should be noted that this condition is very rare, and this indication for plasmapheresis is not commonly seen.

D	Paroxysmal nocturnal haemoglobinuria (PNH)

Paroxysmal nocturnal haemoglobinuria is incorrect. This is a condition with a defect in the PIG-A gene and there is no role for plasmapheresis in this condition.

B	Thalassaemia major

Thalassaemia major is incorrect. There is no role for therapeutic plasma exchange in this condition.

C	Systemic lupus erythematosus(SLE) associated haemolytic anaemia

SLE associated haemolytic anaemia is very rare and would be a very uncommon indication for plasmapheresis.

E	Aplastic anaemia

Aplastic anaemia is also false. Once again, there is no role for plasmapheresis in the management of aplastic anaemia.

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A 45-year-old woman presents with lethargy and a purpuric rash and a diagnosis of acute lymphoblastic leukaemia (ALL) is established. Her white blood cell count is 30 x 10^9 per litre, she has a hyperdiploid karyotype and a common ALL phenotype. Philadelphia chromosome is present.

Which one of the following indicates a poor prognosis?

A	Age under 60 years
B	A hyperdiploid karyotype
C	Common ALL phenotype
D	Female sex
E	Presence of the Philadelphia chromosome

Submit

Previous Question | Skip Question

Calculator

Normal Values

Annotation Stop Share

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4:56
3G

E Presence of the Philadelphia chromosome

The presence of the Philadelphia chromosome indicates a poor prognosis. The Philadelphia chromosome arises from a translocation between the long arms of chromosomes 9 and 22. It is always found in cases of chronic myeloid leukaemia. A minority of cases of acute lymphoblastic leukaemia have this cytogenetic abnormality, and if it is found in ALL it indicates a poor prognosis.

A Age under 60 years

Age under 60 years is incorrect. Disease presenting after the age of 60 is a particularly poor prognostic feature.

B A hyperdiploid karyotype

A hyperdiploid karyotype is incorrect. This means there are more than 50 chromosomes in the leukaemic clone, and this again indicates a good prognosis.

C Common ALL phenotype

Common ALL phenotype is incorrect. This is a good prognostic feature.

D Female sex

Female sex is incorrect. The male sex is associated with a poorer prognosis, although this is more clearly demonstrated in childhood ALL.

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A 19-year-old woman who is currently undergoing intensive chemotherapy for a haematological malignancy comes to the Emergency Department having suffered a fever and sore throat over the past 72 h. On examination her temperature is 38.5°C, BP is 105/70 mmHg, pulse is 95/min and regular. There is clear evidence of pharyngitis and crackles at the right base on auscultation.
Investigations:

Hb	85 g/l
WCC	4.2×10^9/l
Neutrophils	0.1×10^9/l
PLT	20×10^9/l
Na^+	138 mmol/l
K^+	4.2 mmol/l
Creatinine	110 micromol/l

Which of the following is the most appropriate next intervention?

A Close observation

B G-CSF

C IV antibiotics

D Packed red cells

E Platelets

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C IV antibiotics

This lady has neutropaenic sepsis and needs urgent broad-spectrum antibiotics. This is a medical emergency and should be given within an hour of presentation.

B G-CSF

G-CSF is incorrect. G-CSF may be required to reduce the period of neutropaenia, but the most pressing intervention is broad-spectrum antibiotics.

A Close observation

Close observation is incorrect. Close observation is insufficient intervention here. This is a medical emergency that requires broad-spectrum antibiotics.

D Packed red cells

Packed red cells is incorrect. Packed red cells is much less important that IV antibiotics, and the haemoglobin is only 85 g/l in a young woman. This would generally indicate that transfusion was not required at this haemoglobin level.

E Platelets

Platelets is incorrect. Platelet transfusion is usually only given when platelets are less than 20 in the setting of fever, or less than 10 in the absence of fever. Therefore, this could be considered, but not as a first-line intervention before rapidly giving IV antibiotics.

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A 35-year-old man presents to the clinic with fatigue, night sweats and a feeling of abdominal fullness which he feels is limiting the size of meals he can manage. He has seen his GP who checked a full blood count after a trial of omeprazole and found him to be anaemic with raised white cells and platelets. On examination his BP is 132/72 mmHg, pulse is 80/min and regular. There is obvious splenomegaly on palpation of the abdomen. Investigations:

Hb	99 g/l
WCC	21.2 x 10^9/l
PLT	615 x 10^9/l
Na^+	138 mmol/l
K^+	4.4 mmol/l
Creatinine	115 µmol/l

Bone marrow examination is suggestive of chronic myeloid leukaemia.

Which of the following is the most appropriate initial therapy?

A	Allogenic haematopoietic stem cell transplant
B	Busulfan
C	Imatinib
D	Interferon alpha
E	Ponatinib

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C	Imatinib

We are told that this man has chronic myeloid leukaemia. He is mildly anaemic, with a raised white cell count and platelet count. Tyrosine kinase inhibitors are now the gold standard treatment for treating chronic myeloid leukaemia. Their effectiveness is measured by measuring levels of BCR-ABL transcripts by PCR in the peripheral blood.

A	Allogenic haematopoietic stem cell transplant

Allogenic haematopoietic stem cell transplant is incorrect. Before the introduction of tyrosine kinase inhibitors, allogenic stem cell transplantation was the initial treatment of chronic myeloid leukaemia for those patients who were fit enough to tolerate this procedure. It would not be appropriate initial therapy.

B	Busulfan

Busulfan is incorrect. Busulfan is a cytotoxic agent that is generally reserved for palliation only. It has very little role nowadays in chronic myeloid leukaemia. It would not be appropriate initial therapy.

D	Interferon alpha

Interferon alpha is incorrect. Interferon alpha used to be a treatment used before the introduction of tyrosine kinase inhibitors. It would not be appropriate initial therapy.

E	Ponatinib

Ponatinib is incorrect. Ponatinib, although a tyrosine kinase inhibitor, is generally reserved for patients who have either failed on or become intolerant of other tyrosine kinase inhibitors. It would not be appropriate initial therapy.

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5:03
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A 49-year-old man presents with weight loss and is found to have a 5 cm tumour abutting the wall of the stomach. Upon resection it is found to be a gastrointestinal stromal tumour. He is referred to you for consideration of adjuvant therapy. You decide to prescribe him long-term imatinib therapy.

What is the mode of action of imatinib?

A	Epidermal growth factor receptor inhibitor
B	Dihydrofolate reductase inhibitor
C	Serine kinase inhibitor
D	Tyrosine kinase inhibitor
E	Vascular endothelial growth factor receptor inhibitor

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Previous Question | Skip Question

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Annotation
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A 49-year-old man presents with weight loss and is found to have a 5 cm tumour abutting the wall of the stomach. Upon resection it is found to be a gastrointestinal stromal tumour. He is referred to you for consideration of adjuvant therapy. You decide to prescribe him long-term imatinib therapy.

What is the mode of action of imatinib?

Your answer was correct

A	Epidermal growth factor receptor inhibitor
B	Dihydrofolate reductase inhibitor
C	Serine kinase inhibitor
D	Tyrosine kinase inhibitor
E	Vascular endothelial growth factor receptor inhibitor

Explanation

D	Tyrosine kinase inhibitor

Imatinib was originally developed for the treatment of chronic myeloid leukaemia, and is specific for the tyrosine kinases coded for by the bcr-abl translocation (c-kit) and tyrosine kinase activity related to the platelet-derived growth factor receptor. It is also utilised in the management of gastrointestinal stromal tumours, which are driven by the same fusion gene.

Common side effects include oedema, rash, nausea and musculoskeletal pain, but patients normally report these as mild.

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A 34-year-old immigrant of African origin is prescribed ciprofloxacin for an infection. He suffers problems with acute haemolysis. You suspect G6PD deficiency.

Given this, what is the likely underlying cause of haemolysis?

A	A defect on chromosome 21
B	Decreased levels of NADP
C	Increased levels of NADPH
D	Reduced levels of ATP
E	Reduced levels of NADPH

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Previous Question | Skip Question

Calculator

Normal Values

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E Reduced levels of NADPH

Explanation

E Reduced levels of NADPH

The enzyme glucose 6 phosphate dehydrogenase is part of the pentose phosphate pathway. This enzyme converts NADP to the reduced form of this co-enzyme, NADPH. The NADPH in turn maintains the supplyof reduced glutathione in the red blood cells which is used to mop up free radicals that cause oxidative damage. Therefore, in G6PD deficiency, there are reduced levels of NADPH.

A A defect on chromosome 21

A defect on chromosome 21 is incorrect. G6PD deficiency is an X-linked disorder. Abnormalities in chromosome 21 are related to Downs syndrome as well as various malignancies.

B Decreased levels of NADP

Decreased levels of NADP is incorrect. You would expect there to be raised levels of NADP, because of lack of conversion to NADPH by the reduced levels of the enzyme.

C Increased levels of NADPH

Increased levels of NADPH is incorrect. The enzyme glucose 6 phosphate dehydrogenase is part of the pentose phosphate pathway. This enzyme converts NADP to the reduced form of this co-enzyme, NADPH. The NADPH in turn maintains the supply of reduced glutathione in the red blood cells which is used to mop up free radicals that cause oxidative damage. Therefore, in G6PD deficien e are reduced levels of NADPH.

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A 38-year-old man presents with worsening tiredness, night sweats, cough and pruritus. His full blood count shows eosinophilia of 1800/µl (40–400 per µl). His GP checked his FBC 6 months ago, which reveals an eosinophil count of 1500/µl. He has no known allergies and multiple normal stool samples sent for parasite screening.

Which one of the following is the most appropriate treatment?

A	Ampicillin
B	Corticosteroids
C	Cyclophosphamide
D	Interferon-alpha
E	Methotrexate

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Previous Question | Skip Question

Calculator

Normal Values

Annotation | Stop Share

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E Methotrexate

Explanation

B Corticosteroids

Corticosteroids here is probably the most correct answer. All we are told is that this man has eosinophilia. We are also told there is no evidence of parasite in his stool. Apart from that though, we do not have an actual diagnosis. This man actually needs a bone marrow examination to find out whether or not he has a clonal abnormality within his marrow. If there are no reactive causes for the eosinophilia, there are no clonal bone marrow problems either, then one could label him as having idiopathic hypereosinophilic syndrome. In this situation, the patient is best treated with immunosuppression in the form of steroids.

A Ampicillin

Ampicillin is incorrect as there is no reason to suggest an infective aetiology in this question.

C Cyclophosphamide

Cyclophosphamide is incorrect, because corticosteroids are the treatment of choice for idiopathic hypereosinophilic syndrome.

D Interferon-alpha

Interferon-alpha is incorrect because this is not a treatment for hypereosinophilic syndrome.

E Methotrexate

Methotr incorrect because the initial choice of immunosuppression in the hypereosinophilic syndrome is

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A 25-year-old woman noticed one episode of passing blood instead of urine. Her GP arranged for a urological examination, which was normal. She looks anaemic, but examination is otherwise normal.

Which one of the following is the most appropriate test to confirm the likely clinical diagnosis?

A	Bone marrow biopsy
B	Erythrocyte sedimentation rate
C	Full blood count
D	Immunophenotyping
E	Pelvic ultrasound

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Previous Question | Skip Question

Calculator

Normal Values

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D	Immunophenotyping

Paroxysmal nocturnal haemoglobinuria (PNH) is characterised by an increased susceptibility of the patient's red blood cells to lysis by complement. This is due to a deficiency on the surface of the cell membranes of proteins that normally protect the red cells from activated complement.

These proteins are termed CD55 and CD59. The loss of expression of these proteins on the surface of the red blood cells is best determined by immunophenotyping (also known as flow cytometry). This used to be done by the Ham's test, but this is a very outdated and lengthy test. You will sometimes see this in the text books, but it is now never performed in clinical practice, having been superseded by immunophenotyping, which is much more accurate.

E	Pelvic ultrasound

Pelvic ultrasound is incorrect. Pelvic ultrasound has no diagnostic use in this question.

A	Bone marrow biopsy

Bone marrow biopsy is incorrect. Bone marrow biopsy is false as it will not diagnose PNH. It may diagnose aplastic anaemia which is occurring at the same time, but will not confirm the likely diagnosis of PNH.

B	Erythrocyte sedimentation rate

Erythrocyte sedimentation rate (ESR) is incorrect. ESR is far too non-specific to diagnose any particular condition.

C	F od count

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A 76-year-old woman with a history of chronic lymphocytic leukaemia treated with fludarabine is noted to have a haemoglobin of 68g/l. She is notably short of breath and therefore a blood transfusion is ordered. Irradiated red cells are requested.

What is the advantage of irradiated red cells?

A	Inactivates autoantibodies
B	Inactivates donor lymphocytes
C	Inactivates donor platelets
D	Prevents bacterial transmission to recipient
E	Prevents viral transmission to recipient

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Previous Question | Skip Question

Calculator

Normal Values

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Explanation

B	Inactivates donor lymphocytes

Patients who are treated with purine analogue such as fludarabine are T-cell depleted. This places them at risk of transfusion-associated graft-versus-host disease. Irradiated red blood cells therefore inactivate lymphocytes in the transfusion, reducing this risk. Therefore, patients who have been treated with purine analogues must receive irradiated blood products for life.

A	Inactivates autoantibodies

Inactivates autoantibodies is incorrect. Irradiated blood products inactivate lymphocytes in the transfusion.

C	Inactivates donor platelets

Inactivates donor platelets is incorrect. The question specifically refers to irradiating packed red blood cells, rather than platelet transfusion.

D	Prevents bacterial transmission to recipient

Prevents bacterial transmission to recipient is incorrect. Irradiation will not prevent this.

E	Prevents viral transmission to recipient

Prevents viral transmission to recipient is incorrect. Viral transmission to the recipient is not reduced by irradiating the red cells.

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A 30-year-old woman presents to her GP with a 3-day history of menorrhagia. She has no previous history of menstrual irregularity and was previously well. On examination she is pale and has a number of bruises on her arms and legs. Blood tests are sent immediately to the hospital and are reported as follows:

Hb	7.5 g/dll (11.5-16.5)
WCC	1.5 x 10^9/l (4-11 x 10^9) with occasional abnormal immature cells reported on the blood film
Platelets	15 x 10^9/l (150-400 x 10^9)
PT	19 s (12-17)
APTT	45 s (24-38)
TT	22 s (14-22)
Fibrinogen	1.2 g/l (2-5)

Which one of the following is the most likely diagnosis?

A	Acute lymphoblastic leukaemia
B	Acute promyelocytic leukaemia
C	Immune thrombocytic purpura
D	Meningococcal septicaemia
E	Non-Hodgkin's lymphoma

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Explanation

B	Acute promyelocytic leukaemia

This lady has evidence of disseminated intravascular coagulation (DIC). The clotting times are prolonged and the fibrinogen is low. The next question is, what is this due to. She also has a pancytopenic blood picture, suggesting some sort of marrow involvement. We are also told that there are occasional immature cells reported on the blood film. All of this suggests an underlying haematological malignancy for the DIC. Acute promyelocytic leukaemia is classically associated with this. It has the chromosomal translocation t(15,17).It is critically important to identify this at an early stage to reduce the risk of early death due to intra-cerebral haemorrhage. This is a very treatable and curable form of leukaemia.

A	Acute lymphoblastic leukaemia

Acute lymphoblastic leukaemia is incorrect. Acute lymphoblastic leukaemia can certainly cause a pancytopenia, but is not typically associated with DIC.

C	Immune thrombocytic purpura

Immune thrombocytic purpura is incorrect. This would not explain the low haemoglobin, the low white cell count or the abnormal clotting.

D	Meningococcal septicaemia

Meningococcal septicaemia is incorrect. Meningococcal septicaemia can certainly cause DIC. There is nothing, however, in the history to suggest this. Such a profound pancytopenic state would not be expecte ningococcal septicaemia.

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A 28-year-old Afro-Caribbean man with a history of sickle-cell disease presents to the Emergency Department with acute chest pain. He has been well in the days preceding this episode of pain. He is a heavy smoker of 25 cigarettes per day. His chest pain mainly affects the sternum and left side, radiating to the back. It is pleuritic in nature. Temperature is 37.6 °C. There is reduced air entry at the lung bases but no other chest signs. His *pa*(O2) is 6 kPa (11.3–12.6). Chest X-ray reveals some evidence of consolidation at the left base.

What diagnosis fits best with this clinical picture?

A	Acute pneumonia
B	Myocardial infarction
C	Pericarditis
D	Pulmonary infarction
E	Viral lung infection

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Previous Question | Skip Question

Calculator

Normal Values

Annotation Stop Share

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D	Pulmonary infarction

This presentation is known as a chest crisis, and is the commonest cause of mortality in adults with sickle cell disease. A chest X-ray can reveal consolidation, and key management aspects include oxygen, pain relief, adequatehydration and antibiotics. In patients with severe chest crisis, exchange red blood cell transfusion may well be required.

A	Acute pneumonia

Acute pneumonia is incorrect. Acute pneumonia sometimes does co-exist with a thrombotic chest crisis, and patients with sickle-cell disease are more prone to infection because of the loss of splenic function. However, pulmonary infarction is the most common cause of death in such patients, and this needs to be recognised as a separate entity above and beyond infection. Acute pneumonia may precipitate the chest crisis, and both often need treating at the same time.

B	Myocardial infarction

Myocardial infarction is incorrect. We are told that this man has chest X-ray changes, and in the setting of sickle-cell disease, this should indicate a chest crisis. We are also told that this man's chest pain is pleuritic in nature, which is not typical of the pain of a myocardial infarction.

C	Pericarditis

Pericarditis is incorrect. You would not expect the chest X-ray findings in pericarditis,or such a significant hypoxia.

E	Viral lung infection

Viral lung infection is incorrect. Viral lung disease does sometimes

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Acute pneumonia is incorrect. Acute pneumonia sometimes does co-exist with a thrombotic chest crisis, and patients with sickle-cell disease are more prone to infection because of the loss of splenic function. However, pulmonary infarction is the most common cause of death in such patients, and this needs to be recognised as a separate entity above and beyond infection. Acute pneumonia may precipitate the chest crisis, and both often need treating at the same time.

B	Myocardial infarction

Myocardial infarction is incorrect. We are told that this man has chest X-ray changes, and in the setting of sickle-cell disease, this should indicate a chest crisis. We are also told that this man's chest pain is pleuritic in nature, which is not typical of the pain of a myocardial infarction.

C	Pericarditis

Pericarditis is incorrect. You would not expect the chest X-ray findings in pericarditis,or such a significant hypoxia.

E	Viral lung infection

Viral lung infection is incorrect. Viral lung disease does sometimes co-exist with a thrombotic chest crisis, and patients with sickle-cell disease are more prone to infection because of the loss of splenic function. Pulmonary infarction is the most common cause of death in such patients, and this needs to be recognised as a separate entity above and beyond infection. Viral lung disease may precipitate the chest crisis, and both often need treating at the same time.

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A 65-year-old man presents to the oncology clinic for review. He is currently managed with a multi-agent chemotherapy regime and complains of pains, predominantly in his feet, with loss of sensation. This is causing him difficulty in walking. On examination he has a peripheral sensory neuropathy affecting both feet, and loss of the Achilles tendon reflex bilaterally.

Which of the following agents is most likely to have been responsible?

A	Cyclophosphamide
B	Doxorubicin
C	Methotrexate
D	Prednisolone
E	Vincristine

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Previous Question | Skip Question

Calculator

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complains of pains, predominantly in his feet, with loss of sensation. This is causing him difficulty in walking. On examination he has a peripheral sensory neuropathy affecting both feet, and loss of the Achilles tendon reflex bilaterally.

Which of the following agents is most likely to have been responsible?

Your answer was correct

A	Cyclophosphamide
B	Doxorubicin
C	Methotrexate
D	Prednisolone
E	Vincristine

Explanation

E	Vincristine

Neuropathic pain, sensory loss, paraesthesiae, difficulty in walking, slapping gait, loss of deep tendon reflexes, ataxia, paresis, foot drop and cranial nerve palsies, especially ocular palsies and laryngeal nerve paralysis, are described in association with vincristine treatment. Frequently, there appears to be a sequence in the development of neuromuscular side effects. Initially, one may encounter only sensory impairment and paraesthesiae, with other symptoms appearing later. Other cytotoxic agents which commonly cause peripheral neuropathies are platinum agents (e.g. cisplatin, carboplatin) and taxanes (eg paclitaxel, docetaxel).

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A Cyclophosphamide

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A 55-year-old woman is diagnosed with thyroid cancer. She discloses a family history of several kinds of tumour including thyroid carcinoma. At her next appointment she attends for review with her two children, aged 14 and 12. She has heard that genetic screening for the ret proto-oncogene may help inform the risk of cancer development in her two children.

Which of the following types of thyroid malignancy is associated with ret proto-oncogene positivity?

A	Anaplastic carcinoma
B	Follicular carcinoma
C	Medullary carcinoma
D	Papillary carcinoma
E	Thyroid lymphoma

47317

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Previous Question Skip Question

Calculator

Normal Values

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C Medullary carcinoma

The ret proto-oncogene is found on chromosome 10. It codes for a receptor tyrosine kinase. Loss of function mutations are associated with Hirschprung's disease, and gain of function mutations are associated with multiple endocrine neoplasia 2 syndrome (MEN2) and medullary thyroid carcinoma (MTC). MTC, MEN2a, and MEN2b are thought to be associated with slightly different activating point mutations in the ret proto-oncogene.

MEN2a is associated with MTC, phaeochromocytoma and primary hyperparathyroidism. MEN2b is associated with MTC, phaeochromocytoma, marfanoid habitus and mucosal/digestive neurofibromatosis. The most common presentation of MEN2 is with MTC. Inheritance is autosomal dominant; however, a proportion of cases occur due to spontaneous mutations in patients with no family history of the disorder.

A Anaplastic carcinoma

Anaplastic carcinoma is incorrect. Anaplastic carcinoma is not associated with mutations in the ret proto-oncogene.

B Follicular carcinoma

Follicular carcinoma is incorrect. Follicular carcinoma is not associated with mutations in the ret proto-oncogene.

D Papillary carcinoma

Papillary carcinoma is incorrect. Papillary carcinoma is not associated with mutations in the ret proto-oncogene.

E Thyroid lymphoma

Thyroid lymphoma is incorrect. Thyroid lymphoma is not associated

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A 57-year-old woman is referred to you as an emergency with severe nose bleeds and skin petechiae. You suspect she has thrombocytopenia. She is currently receiving second-line carboplatin-based chemotherapy for a relapsed ovarian carcinoma. There is no organomegaly.

Which one of the following is the most likely cause of the thrombocytopenia?

A	Carcinomatosis
B	Disseminated intravascular coagulation
C	Myelofibrosis
D	Myelosuppression
E	Secondary leukaemia

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Previous Question | Skip Question

Calculator

Normal Values

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Explanation

D	Myelosuppression

This patient has thrombocytopenia while receiving chemotherapy, so this has to be the most obvious cause for the thrombocytopenia.

A	Carcinomatosis

Carcinomatosis is incorrect. Carcinomatosis is a possible differential diagnosis due to bone marrow invasion, but this would not be entertained when there is such an immediately obvious cause, such as drug-related myelosuppression.

B	Disseminated intravascular coagulation

Disseminated intravascular coagulation (DIC) is incorrect. DIC can occur secondary to malignancy but is relatively rare, and is more often seem with acute leukemias. The history suggests that the patient is most likely to be suffering from a drug induced thrombocytopenia.

C	Myelofibrosis

Myelofibrosis is incorrect. Myelofibrosis can present with thrombocytopenia, particularly when associated with splenomegaly, but there is nothing to suggest this second pathology in the question.

E	Secondary leukaemia

Secondary leukaemia is incorrect. Secondary leukaemias can occur following chemotherapy, but this usually occurs many years afterwards, and therefore the time frame is too short.

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A 35-year-old man with haemophila B and associated arthropathy presents with a large swollen knee joint after playing football with his young son. He is unable to weight bear.

Which one of the following is the most appropriate treatment?

A	Aspiration of the joint
B	Bed rest and analgesia
C	Intravenous DDAVP
D	Intravenous factor IX concentrate
E	Intravenous infusion of cryoprecipitate

45465

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Previous Question | Skip Question

Calculator
Annotation
Stop Share
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Audio
Video
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Participants
More

D	Intravenous factor IX concentrate

Haemophilia B is deficiency of factor IX and is inherited in an X-linked recessive pattern, meaning that only males are affected. The only way to treat this is with intravenous factor IX concentrate.

B	Bed rest and analgesia

Bed rest and analgesia is incorrect. The factor IX levels need to be raised quickly to stop ongoing bleeding into the joint, which can lead to long-term disability if left unchecked.

A	Aspiration of the joint

Aspiration of the joint is incorrect. Aspiration of the joint should never be done. This will only worsen the bleeding and can give rise to infection.

C	Intravenous DDAVP

Intravenous DDAVP (desmopressin) is incorrect. Intravenous DDAVP can be used to treat mild haemophilia A in cases where minor surgical procedures such as a dental extraction are needed. However, DDAVP is not effective in patients with haemophilia B, who are unresponsive to this treatment.

E	Intravenous infusion of cryoprecipitate

Intravenous infusion of cryoprecipitate is incorrect. Intravenous infusion of cryoprecipitate used to be a treatment for haemophilia before the availability of plasma-derived clotting factors that are much safer because of processes of viral inactivation to prevent viral tra on.

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A young woman is pregnant for the first time. Her father is known to have glucose-6-phosphate dehydrogenase deficiency, which manifests as occasional mild episodes of acute intravascular haemolysis. She asks about the likelihood of her baby being born with the disease.

Which one of the following is most likely?

A	If affected, the baby should undergo splenectomy early in life
B	If affected, the baby will have neonatal jaundice
C	If the child is a boy, he will have a 50% chance of having the disease
D	If the child is a girl, she will not have clinical disease
E	The baby is never at risk of neonatal jaundice

Previous Question
Skip Question
Calculator
Normal Values

Annotation
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Audio
Video
Share
Participants
More

C | If the child is a boy, he will have a 50% chance of having the disease

Here the question needs to be read carefully. This young woman is pregnant. Her father is known to have G6PD deficiency. This is inherited as an X-linked recessive condition. Let us assume that the mother is unaffected (XX), the father is affected (denoted by X'Y). This means that when these two people have children, there can be four possible outcomes - XX', XX', XY, XY.

This means that the woman must be an obligate carrier.

Now let us assume that this obligate carrier XX' has a child with an unaffected male. The four possible outcomes of this can be X'X, XX, X'Y and XY. This shows, therefore, that if the child is a boy (XY), he will have a 50% chance of having the disease.

D | If the child is a girl, she will not have clinical disease

If the child is a girl, she will not have clinical disease is incorrect. It can be determined from the genetic explanation for the condition that there is the possibility of a daughter being born with one affected X chromosome. In extreme cases of lyonisation, the normal X chromosome could be inactivated, and as a result of the other X chromosome being affected, there may be significantly reduced levels of G6PD to result in clinical disease.

A | If affected, the baby should undergo splenectomy early in life

If affected, the baby should undergo splenectomy early in life is incorrect. Splenectomy is rarely required.

B | If affected, the baby will have neonatal jaundice

If affect baby will have neonatal jaundice is incorrect. This is not a condition that commonly pre-disposes to neonatal jaundice, rather pre-disposing to episodic haemolytic anaemia, which may be triggered by drugs, infections andvarious types of beans.

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If affected, the baby should undergo splenectomy early in life is incorrect. Splenectomy is rarely required.

B	If affected, the baby will have neonatal jaundice

If affected, the baby will have neonatal jaundice is incorrect. This is not a condition that commonly pre-disposes to neonatal jaundice, rather pre-disposing to episodic haemolytic anaemia, which may be triggered by drugs, infections andvarious types of beans.

E	The baby is never at risk of neonatal jaundice

The baby is never at risk of neonatal jaundice is incorrect. Although neonatal jaundice is uncommon, it can occur. A useful rule in MRCP exams is that all answers that include the word 'never' are always false.

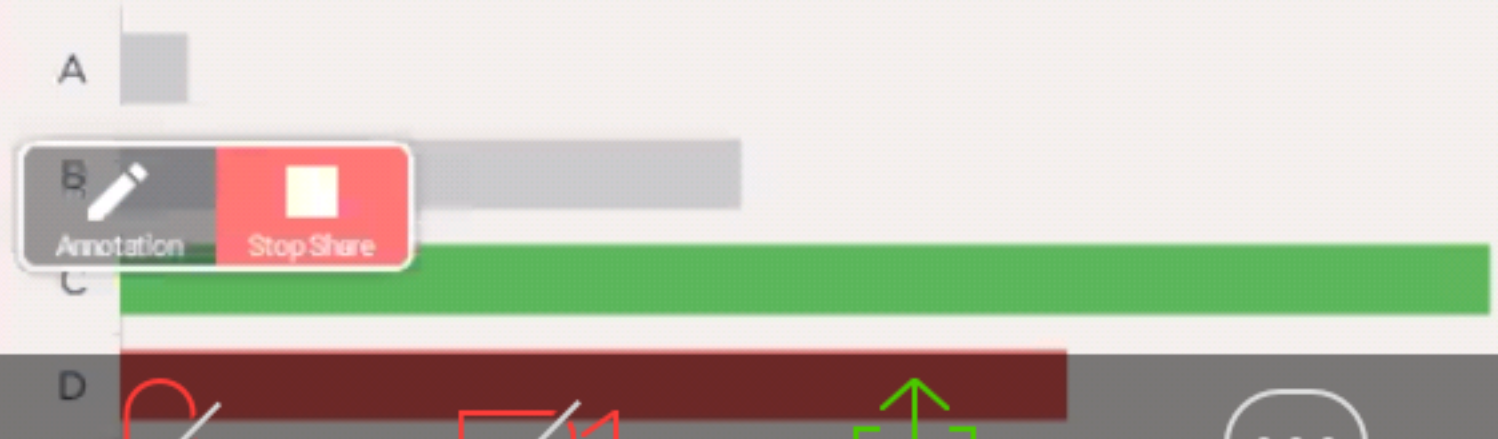
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Video
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More

A 72-year-old woman, who lives in a residential home because of limited mobility, is admitted to the Emergency Department with a severe headache and left sided weakness. Past history of note includes COPD, hypertension and peripheral vascular disease. Apparently other residents in the same home have been affected by food poisoning symptoms, as have children from a nursery, one of who is in the hospital with acute renal impairment.

On examination her BP is 155/90 mmHg; pulse is 80/min and regular. Her temperature is 37.9°C. Heart sounds are normal and there is quiet wheeze on auscultation of the chest. You notice a purpuric rash affecting both forearms, and petechiae over her upper chest. She has weakness of the left side of her face and her left arm and is moaning because of her headache.

Investigations:

Hb	9.8 g/dl (fragmented red cells seen on the blood film)
WCC	12.8 $x10^9$/l
PLT	52 $x10^9$/l
PT	28.1 s
APTT	54.2 s
Na^+	137 mmol/l
K^+	5.0 mmol/l
Creatinine	187 micromol/l (up from 131 last time it was checked in clinic)
Glucose	5.9 mmol/l
CT head	no evidence of intracerebral haemorrhage

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Which of the following is the most useful intervention?

A Eculizumab

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left arm and is moaning because of her headache.

Investigations:

Hb	9.8 g/dl (fragmented red cells seen on the blood film)
WCC	12.8 x10^9/l
PLT	52 x10^9/l
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Glucose	5.9 mmol/l
CT head	no evidence of intracerebral haemorrhage

Which of the following is the most useful intervention?

A	Eculizumab
B	FFP
C	IV ciprofloxacin
D	IV corticosteroids
E	Plasma exchange

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E	Plasma exchange

Plasma exchange is the most useful intervention. This lady has been affected by food poisoning, along with other residents in the same home. One of the other residents has had acute renal impairment. This lady has a purpuric rash, which is associated with her thrombocytopaenia. In addition she is anaemic, with a normal white cell count. She has evidence of worsening renal impairment and she also has neurological signs in that she has left-sided weakness.

The possibility of thrombotic thrombocytopaenic purpura (TTP) is raised, given this history, the physical findings and the lab results. This is associated with a microangiopathic haemolytic anaemia, when there is anaemia and thrombocytopaenia for no other apparent reason. There was also evidence of acute renal failure, which is seen in TTP. There are also neurological signs in TTP as in this patient. The best treatment for TTP is plasma exchange with fresh frozen plasma.

A	Eculizumab

Eculizumab is incorrect. Eculizumab is a treatment that is used on PNH and is a monoclonal antibody against complement. It is used in the treatment of TTP, but usually only where it is refractory to other interventions.

B	FFP

FFP is incorrect. A simple infusion with plasma in the form of FFP is less efficacious than plasma exchange in this situation. Where there is focal neurological deficit, plasma exchange can significantly improve neurological outcomes.

C	IV ciprofloxacin

IV ciprofloxacin is incorrect. This lady needs plasma exchange with FFP as her treatment. Some studies suggest that quinolones in this case to combat E coli infection may actually worsen

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FFP is incorrect. A simple infusion with plasma in the form of FFP is less efficacious than plasma exchange in this situation. Where there is focal neurological deficit, plasma exchange can significantly improve neurological outcomes.

C IV ciprofloxacin

IV ciprofloxacin is incorrect. This lady needs plasma exchange with FFP as her main treatment. Some studies suggest that quinolones in this case to combat E coli infection may actually worsen outcomes.

D IV corticosteroids

IV corticosteroids is incorrect. IV corticosteroids again can be used as adjunctive treatment in TTP, but plasma exchange with FFP is the primary treatment required. Data on use of corticosteroids is conflicting, with limited evidence of benefit.

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B

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A 45-year-old woman presents with rectal bleeding and weight loss. She is found to have a metastatic adenocarcinoma of the colon. She was previously fit and well and takes no regular medications. A regime of combination chemotherapy with capecitabine is planned.

What is the major advantage of capecitabine over 5-fluorouracil?

A	Eliminated by the kidneys
B	Half life
C	Oral administration
D	Reversible toxicity
E	Volume of distribution

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Explanation

C	Oral administration

Capecitabine is a prodrug of 5-fluorouracil (5-FU). Its major advantage is with respect to oral administration, versus IV administration for 5-FU. The administration of 5-FU requires a central venous access device to be inserted (eg Hickman line) through which a 48-h infusion is given every fortnight. Capecitabine oral tablets are taken twice daily, reducing the number of hospital visits and invasive procedures required for oncology patients.

Given that 5-FU is the active metabolite of capecitabine, half-life, toxicity, elimination and volume of distribution are essentially the same. Data on efficacy are broadly similar for 5-FU and capecitabine. Toxicities include neutropaenia, diarrhoea, hand-foot syndrome and, rarely, coronary vasospasm. Patient education is crucial when administering oral chemotherapy in order to prevent patients from continuing treatment without seeking medical advice in the face of severe toxicity.

A	Eliminated by the kidneys

Eliminated by the kidneys is incorrect. Given that 5-FU is the active metabolite of capecitabine, elimination is essentially the same; capecitabine, however, has an advantage with its route of administration.

B	Half life

Half life is incorrect. Given that 5-FU is the active metabolite of capecitabine, half life is essentially the same; capecitabine, however, has an advantage with its route of administration.

D	Reversible toxicity

Reversible is incorrect. Given that 5-FU is the active metabolite of capecitabine, toxicity is essentially the same;

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A 16-year-old patient presents with purpura on his back, buttocks and extensor surface of his lower limbs. He has dipstick haematuria.

Which one of the following is the most likely diagnosis?

A	Haemophilia A
B	Henoch-Schönlein purpura
C	Idiopathic thrombocytopaenic purpura
D	Leukaemia
E	Thalassaemia trait

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B	Henoch-Schönlein purpura

The clinical presentation is entirely typical, with a purpuric rash on the back, buttocks and extensor surfaces of this young man's lower limbs. The haematuria is also suggestive of this vasculitic process. It should be noted that this vasculitic process does not result in thrombocytopaenia as platelet numbers are usually normalor raised.

A	Haemophilia A

Haemophilia A is incorrect. This is not the correct presentation. Haemophilia results in joint and muscle bleeding, which is not the case in this situation. Also, it would not result in haematuria.

C	Idiopathic thrombocytopaenic purpura

Idiopathic thrombocytopaenic purpura (ITP) is incorrect. The presentation in this young man is entirely typical of Henoch-Schönlein purpura. It is a bit difficult to justify a diagnosis of ITP without a reduced platelet count being discussed. Also normally ITP would not result in haematuria.

D	Leukaemia

Leukaemia is incorrect. If we were suggesting that acute leukaemia was causing this problem, the patient might be expected to be thrombocytopaenic. We are not given a blood count here, and thrombocytopaenia in its own right would not result in haematuria. The clinical presentation is much more compatible with Henoch-Schönlein purpura.

E	Thalassaemia trait

Thalassaemia trait is incorrect. There is nothing in the history to sugge[illegible] his would not result in purpura. This is usually an asy[illegible]te.

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4:36
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What are the tumour cells called that are found in patients with Hodgkin's disease?

A	Philadelphia cells
B	Cytotoxic lymphocytes
C	Reed-Sternberg cells
D	Activated lymphocytes
E	Langerhans' cells

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Previous Question | Skip Question

Calculator

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A	Philadelphia cells

Philadelphia cells is incorrect. There is no such cell; the Philadelphia chromosome is found in CML.

B	Cytotoxic lymphocytes

Cytotoxic lymphocytes is incorrect.

D	Activated lymphocytes

Activated lymphocytes is incorrect.

E	Langerhans' cells

Langerhans'cells is incorrect. These are dendritic cells of the skin and mucosa.

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A 63-year-old woman presents with features of biventricular failure. On investigation she has a pulse of 100 bpm, BP 100/60 mmHg and bilateral retinal haemorrhages on fundoscopy. She has improved clinically following administration of intravenous diuretic.

Her blood tests reveal the following:

Hb	55 g/l
Hct	0.19
MCV	118
MCH	33
WCC	3.4
Plt	95

Which one of the following is the most appropriate next step in her management?

A	Blood transfusion
B	Bone marrow aspirate examination
C	Intramuscular B12 administration
D	Intramuscular B12 administration with oral folate supplements
E	Oral folate supplements only

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4:38
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Explanation

A	Blood transfusion

It sounds as if this lady is symptomatic with her macrocytic anaemia. The underlying diagnosis could well be a B12 or folate deficiency. Myelodysplasia could be another differential. B12, folate and serum ferritin levels should betaken before the transfusion. A single unit transfusion should be given slowly, with her clinical response assessed after each unit.

B	Bone marrow aspirate examination

Bone marrow aspirate examination is incorrect. You would await the results of the haematinic evaluation before proceeding to this. If, however, the haematinics were normal and there was no other obvious cause for the macrocytic anaemia, then a bone marrow examination would be indicated to look for evidence of primary haematological disorders such as myelodysplasia.

C	Intramuscular B12 administration

Intramuscular B12 administration is incorrect. Intramuscular B12 administration would only be started once the B12 levelswere demonstrated to be low. It should be noted that both B12 and folate deficiencies can cause other cytopaenias apart from anaemia, such as leukopaenia and thrombocytopaenia.

D	Intramuscular B12 administration with oral folate supplements

Intramuscular B12 administration with oral folate supplements is incorrect. Intramuscular B12 administration would only be started once the B12 levels were demonstrated to be low. It should be noted that both B12 and folate deficiencies can cause other cytopaenias apart from anaemia, such as leukopaenia and thrombocy ia.

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Serum tumour markers are frequently utilised in the management of cancer patients.

The determination of the carcinoembryonic antigen (CEA) in patients with carcinoma of the colon is most useful for which one of the following?

A	As a parameter for operability
B	As a screening method
C	For postoperative surveillance
D	For staging
E	The detection of an early stage tumour

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Previous Question | Skip Question

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4:39
3G

C For postoperative surveillance

CEA is an oncofetal protein that is elevated in the serum of patients with a variety of cancers, including colorectal cancer. In patients with established disease, the absolute level of the serum CEA correlates with disease burden and should return to baseline after complete resection. Between 60 and 90% of patients with a relapse have elevated CEA (ref Hara M, Kanemitsu Y, Hirai T, *Dis. Colon Rectum*, 2008).

E The detection of an early stage tumour

The detection of an early stage tumour is incorrect. Serum CEA lacks sensitivity and specificity and so is not a useful diagnostic tool for detection of early stage cancers.

A As a parameter for operability

As a parameter for operability is incorrect. Serum CEA has no bearing as a parameter for operability.

B As a screening method

As a screening method is incorrect. Because it lacks both sensitivity and specificity, serum CEA is not a useful screening tool for colorectal cancer. Non-cancer-related causes of an elevated CEA include gastritis, peptic ulcer disease, diverticulitis and liver disease. Colorectal cancer screening involves faecal occult blood testing and lower gastrointestinal endoscopy.

D For staging

For staging is incorrect. Tumour staging does not include CEA levels and is based on tumour, node, metastasis (TNM) histopatho evaluation. Pre-surgical staging evaluations include CT imaging of the thorax, abdomen and pelvis, MRI of the

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A 74-year-old woman presented with a 2-day history of extensive bruising. She has a history of ischaemic heart disease and is a heavy smoker. Her regular medication is amlodipine and aspirin. She had recently started quinine sulfate for night cramps. Her blood results are:

Hb	11.4 g/dl
MCV	87 fl
MCH	30 pg
MCHC	31 g/dl
WCC	7.2 × 10^9/litre with a normal differential
platelets	11 × 10^9/litre
Urea	normal
electrolytes	normal

Which one of the following is the most likely cause of her thrombocytopenia?

A	Drug-dependent immune thrombocytopenia
B	Acute myeloid leukaemia
C	Immune thrombocytopenic purpura
D	Disseminated carcinoma
E	Myelodysplastic syndrome

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We have been told that this woman has recently started a new drug in the form of quinine sulfate. This is known to cause a drug-induced thrombocytopenia. Note that the blood count shows a relatively isolated thrombocytopenia, with a virtually normal haemoglobin, and normal white cell count with a normal differential. The fact that she has a thrombocytopenia following the introduction of a new drug suggests this diagnosis.

C Immune thrombocytopenic purpura

Immune thrombocytopenia purpura is a possibility, but the fact that the question states that she has recently started a drug that is associated with thrombocytopenia should point more towards a drug-dependent immune thrombocytopenia.

B Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. It would be unusual to have acute myeloid leukaemia with a normal white cell count with a normal differential.

D Disseminated carcinoma

Disseminated carcinoma is incorrect. As stated above, the answer is more pointing towards a drug-dependent immune thrombocytopenia. One would imagine that if the cause of thrombocytopenia was disseminated carcinoma, presumably due to marrow involvement, the rest of the blood count would be more severely affected, with a more profound anaemia and leucopenia.

E Myelodysplastic syndrome

Myelodysplastic syndrome is incorrect. The patient is not significantly anaemic, and has a normal white cell count and a normal diff . Although myelodysplasia can cause a low plate usually only occurs to such a level of severity

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A 55-year-old single Afro-Caribbean lady presented to the Emergency Department of a busy general hospital in the UK with sudden onset of confusion, coma and constipation. On examination, she was febrile with generalised plaque-like lesions noted. There were some palpable symmetrical lymph nodes in the cervical region. Her FBC showed a pleomorphic lymphocytosis with a characteristic morphology. Her serum calcium was elevated at 2.79 mmol/l.

What viral agent should be sought to confirm the diagnosis?

A	Cytomegalovirus infection
B	Epstein Barr virus infection
C	Human immunodeficiency virus 1
D	Human T-cell lymphotropic virus 1
E	Varicella zoster virus

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Previous Question | Skip Question

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4:43
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D Human T-cell lymphotropic virus 1

This lady is of Afro-Caribbean origin and presents with skin lesions, lymphadenopathy and hypercalcaemia. These features are suggestive of adult T-cell leukaemia/lymphoma. This is associated with the human T-cell leukaemia virus type I (HTLV-1). Treatment is with chemotherapy, but overall survival is poor.

B Epstein Barr virus infection

Epstein Barr virus infection is incorrect. Epstein Barr virus is not responsible for adult T-cell leukaemia/lymphoma.

A Cytomegalovirus infection

Cytomegalovirus is incorrect. Cytomegalovirus is not responsible for adult T-cell leukaemia/lymphoma.

C Human immunodeficiency virus 1

Human immunodeficiency virus 1 is incorrect. Human immunodeficiency virus 1 is not responsible for adult T-cell leukaemia/lymphoma.

E Varicella zoster virus

Varicella zoster virus is incorrect. Varicella zoster virus is not responsible for adult T-cell leukaemia/lymphoma.

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Which one of the following is the MOST common cause of aplastic crisis in a patient with sickle cell disease?

A	Dehydration
B	Respiratory syncytial virus infection
C	Human parvovirus B19 infection
D	Repeated blood transfusion
E	*Haemophilus influenzae* septicaemia

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E	*Haemophilus influenzae* septicaemia

Explanation

C	Human parvovirus B19 infection

Human parvovirus B19 infection is the most common cause of an aplastic crisis in patients with sickle cell disease. This usually occurs more frequently in children than adults. Essentially this causes a sudden halt in the production of red blood cells, with a low reticulocyte count.

A	Dehydration

Dehydration is incorrect. This causes the typical vaso-occlusive crisis in patients with sickle cell disease.

B	Respiratory syncytial virus infection

Respiratory syncytial virus infection is incorrect. Respiratory syncytial virus infection does not cause an aplastic crisis, but as it can cause a respiratory infection, it again could cause a vaso-occlusive crisis.

D	Repeated blood transfusion

Repeated blood transfusions is incorrect. Repeated blood transfusions do not cause an aplastic crisis.

E	*Haemophilus influenzae* septicaemia

Haemophilus influenzae septicaemia is incorrect. Haemophilus influ[illegible]emia could once again cause a painful vaso-occlusive c[illegible] a result of significant infection.

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A 72-year-old man who takes 75 mg of aspirin daily presents to the GP complaining of large ecchymoses on his arms. He is concerned that he might be bleeding excessively. He has suffered a myocardial infarction some 3 years earlier and other current medication includes ramipril 10 mg, bendroflumethiazide 2.5 mg and atorvastatin 10 mg. On examination he is apyrexial, his BP is 142/84 mmHg, pulse 74 bpm, regular. He has extensive ecchymoses on both forearms.

Investigations:

Hb	121 g/l
WCC	6.1 x 10^9/l
PLT	140 x 10^9/l
Na^+	140 mmol/l
K^+	4.5 mmol/l
Creatinine	130 umol/l
PT	16.2s (11.5 - 15.5)
APPT	33.1s (30-40)

Which one of the following is the most likely diagnosis?

A	Aspirin-related ecchymoses
B	DIC
C	ITP
D	[illegible] bruising

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GP complaining of large ecchymoses on his arms. He is concerned that he might be bleeding excessively. He has suffered a myocardial infarction some 3 years earlier and other current medication includes ramipril 10 mg, bendroflumethiazide 2.5 mg and atorvastatin 10 mg. On examination he is apyrexial, his BP is 142/84 mmHg, pulse 74 bpm, regular. He has extensive ecchymoses on both forearms.

Investigations:

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Creatinine	130 umol/l
PT	16.2s (11.5 - 15.5)
APPT	33.1s (30-40)

Which one of the following is the most likely diagnosis?

A	Aspirin-related ecchymoses
B	DIC
C	ITP
D	Traumatic bruising
E	TTP

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A	Aspirin-related ecchymoses

This man has extensive bruising on both forearms and is currently on 75 mg daily of aspirin. His platelet count is ever so slightly reduced, but not to a level that would predispose to significant bruising. The PT is ever so slightly raised, but once again not all that significant. The PTT is within normal limits. Elderlypatients often have bruising on their forearms, and this is known as senile purpura. Taking anti-plateletagents often makes this worse.

B	DIC

DIC is incorrect. DIC occurs in unwell patients, and results in a significant thrombocytopaenia, associated with prolongation of the clotting times. This is not the case in this situation.

C	ITP

ITP is incorrect. The platelet count is only marginally reduced at 140, a level at which one would not expect such widespread spontaneous bruising.

D	Traumatic bruising

Traumatic bruising is incorrect. There is nothing to suggest this in the question. The bruising ison both forearms, and traumatic bruising would be more likely unilateral in nature.

E	TTP

TTP is incorrect. TTP is entirely false. This would be associated with a significant microangiopathic haemolytic anaemia, associated with a thrombocytopaenia. There are no clinical or laboratory parameters to suggest this.

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A 75-year-old woman presents on the medical take with haematemesis. On examination she is anaemic and has 2 cm of splenomegaly.

Investigation:

Hb	8.2 g/dl (11.5-16.5)
RCC	5.9 × 10^{12}/l ((3.8-5.8) × 10^{12})
Hct	0.40 (0.36-0.47)
MCV	70 fl (80-96)
MCH	24 pg (28-32)
MCHC	29.5 g/dl (32-35)
WCC	15.5 × 10^{9}/l ((4-11) × 10^{9})
Platelets	756 × 10^{9}/l ((150-400) × 10^{9})
Coagulation screen	Normal
Ferritin	8 µg/l (15-200)

Which one of the following is the most likely cause of her haematological problem?

A	Chronic myeloid leukaemia
B	Iron deficiency anaemia
C	Myelofibrosis
D	Polycythaemia vera
E	Primary thrombocythaemia

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Investigation:

Hb	8.2 g/dl (11.5-16.5)
RCC	5.9 × 10^{12}/l ((3.8-5.8) × 10^{12})
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Platelets	756 × 10^{9}/l ((150-400) × 10^{9})
Coagulation screen	Normal
Ferritin	8 µg/l (15-200)

Which one of the following is the most likely cause of her haematological problem?

A	Chronic myeloid leukaemia
B	Iron deficiency anaemia
C	Myelofibrosis
D	Polycythaemia vera
E	Primary thrombocythaemia

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E Primary thrombocythaemia

Explanation

D Polycythaemia vera

This is also known as primary polycythaemia. She has had haematemesis and has splenomegaly. The red cell count is elevated. Plateletcount is also elevated and she has a low serum ferritin.This blood picture is consistent with iron-deficient primary polycythaemia. She also has a raised white cell count and platelet count suggesting an underlying myeloproliferative disorder. A raised red cell count is very specific to polycythaemia. 95% of cases with primary polycythaemia have mutations in the JAK2 gene.

E Primary thrombocythaemia

Primary thrombocythaemia is incorrect. Primary thrombocythaemia is also known as essential thrombocythaemia. This might cause a raised white cell count and platelet count; however, it is not usually associated with anaemia, and it also would not give rise to a raised red cell count.

A Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. It would not explain the raised red cell count. The white cell count in chronic myeloid leukaemia is often very, very elevated (greater than $200 \times 10^9/l$), which is not seen here.

B Iron deficiency anaemia

Iron deficiency anaemia is incorrect. Although this lady has a low serum ferritin, there is more to this question than simple iron deficiency. The explanation to the correct answer states, this is in fact iron deficient primary polycythaemia. She has a

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raised red cell count. The white cell count in chronic myeloid leukaemia is often very, very elevated (greater than 200 × 10^9/l), which is not seen here.

B	Iron deficiency anaemia

Iron deficiency anaemia is incorrect. Although this lady has a low serum ferritin, there is more to this question than simple iron deficiency. As the explanation to the correct answer states, this is in fact iron deficient primary polycythaemia. She has a myeloproliferative disorder, as demonstrated by splenomegaly, a raised red cell count, a raised white cell count and a raised platelet count. Iron deficiency can result because of the increased red cell production. However, iron replacement should only be ever given with much caution, with weekly blood counts, as this can cause a dangerous rise in the haematocrit which can precipitate cerebro-vascular events.

C	Myelofibrosis

Myelofibrosis is incorrect. Myelofibrosis can cause splenomegaly, with evidence of a myeloproliferative disorder such as a raised white cell count and platelet count. It can also cause anaemia. However, it would not be associated with a raised red cell count or iron deficiency.

Rate this question:

A 76-year-old patient is attending the day unit for blood transfusion. She has a history of chronic lymphocytic leukaemia (CLL). She is very short of breath and feels permanently lethargic. She is currently receiving a fludarabine-based treatment regime. A recent Hb has been measured at 7.4 g/dl. Her low Hb is thought to be a result of both bone marrow failure and a degree of autoimmune haemolyticanaemia.

Investigations:

Hb	74 g/l
WCC	97 x 10^9/l
PLT	132 x 10^9/l
Na^+	141 mmol/l
K^+	5.2 mmol/l
Creatinine	142 mmol/l

Which one of the following is true with respect to the best way to replace her red cells?

A	She can receive whole blood
B	She can receive whole blood with prednisolone cover
C	She may receive whole blood through a white cell filter
D	She should receive irradiated red cells
E	She should receive whole blood with chlorpheniramine cov

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D	She should receive irradiated red cells

This lady has CLL and has been receiving a fludarabine based regimen. This is a purine analogue. All patients who receive this type of drug need to receive irradiated blood products. Fludarabine will reduce the recipient's T-cells, making them at risk of transfusion-associated graft-versus-host disease. Irradiation of blood products will reduce this risk.

C	She may receive whole blood through a white cell filter

She may receive whole blood through a white cell filter is incorrect. Nobody receives whole blood nowadays. It is always separated into individual components, namely red blood cells and platelets.

A	She can receive whole blood

She can receive whole blood is incorrect. Hardly anyone now needs to receive whole blood. It is always separated into individual components, namely red blood cells and platelets.

B	She can receive whole blood with prednisolone cover

She can receive whole blood with prednisolone cover is incorrect. Nobody receives whole blood nowadays. It is always separated into individual components, namely red blood cells and platelets.

E	She should receive whole blood with chlorpheniramine cover

She should receive whole blood with chlorpheniramine cover is incorrect. Nobody receives whole blood nowadays. It is always separated into individual components, namely red blood cells and platelets.

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4:54
On
738-627-5670
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A 62-year-old man presents to the clinic with increased tiredness and night sweats over the past few months. He also reports dull, left-sided abdominal pain and early satiety. There is a past medical history of hypertension and an inferior MI, but nil else of note. Examination reveals a BP of 155/85 mmHg, pulse is 80/min and regular. He looks pale. There is splenomegaly and hepatomegaly on palpation of the abdomen.

Investigations:

Hb	9.2 g/dl
MCV	96 fl
WCC	23.2 x 10^9/l (granulocytosis including elevated eosinophils, basophils and immature white cells)
PLT	522 x 10^9/l
Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	115 micromol/l
ALT	185 U/l
ALP	382 U/l
LDH	852 U/l

Which of the following is the most likely diagnosis?

A	Acute lymphocytic leukaemia
B	Acute myeloid leukaemia
C	lymphocytic leukaemia

Annotation
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Video
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Participants
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4:55
Question 20 of 326

palpation of the abdomen.

Investigations:

Hb	9.2 g/dl
MCV	96 fl
WCC	23.2 x 10^9/l (granulocytosis including elevated eosinophils, basophils and immature white cells)
PLT	522 x 10^9/l
Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	115 micromol/l
ALT	185 U/l
ALP	382 U/l
LDH	852 U/l

Which of the following is the most likely diagnosis?

A	Acute lymphocytic leukaemia
B	Acute myeloid leukaemia
C	Chronic lymphocytic leukaemia
D	Chronic myeloid leukaemia
E	Myelofibrosis

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D	Chronic myeloid leukaemia

Chronic myeloid leukaemia (CML) is the most likely diagnosis. Clinically he has hepatosplenomegaly. He is slightly anaemic, has a raised white cell count withmultiple early white cell precursors, as well as a high platelet count. He also has a raised basophil count, and all of these features suggest CML.

The Philadelphia chromosome is characteristic of CML, and occurs as a result of translocation between the long arms of chromosomes 9 and 22. Tyrosine kinase inhibitors such as imatinib now are the mainstay of treatment.

A	Acute lymphocytic leukaemia

Acute lymphocytic leukaemia is incorrect. There is no suggestion of a lymphocytosis on the blood film. Most patients with acute leukaemia have a thrombocytopaenia, not a thrombocytosis.

B	Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. There is no suggestion that this man has increased blastson the peripheral blood. The white cell count is instead composed of more mature cells. A low platelet count would usually be expected in acute leukaemia, not anelevated one.

C	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. There is no evidence of a lymphocytosison the white cell differential.

E	Myelofibrosis

Myelofib incorrect. Myelofibrosis typically results in a leucoerythroblastic blood picture, with evidence of teardrop red

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What is the average lifespan of an erythrocyte once it has entered the bloodstream?

A	1 day
B	10 days
C	120 days
D	200 days
E	360 days

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Explanation

C	120 days

The average lifespan of an erythrocyte once it has entered the blood stream is approximately 120 days. The lifespan of a white blood cell is much shorter, with the lifespan of a circulating neutrophil being about 5.4 days. The average lifespan of circulating platelets is 8–9 days.

A	1 day

1 day is incorrect.

B	10 days

10 days is incorrect.

D	200 days

200 days is incorrect.

E	360 days

360 days is incorrect.

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A 73-year-old man presents to the Emergency Department with a pathological fracture of the left humerus. He has a history of prostatic carcinoma treated with anastrozole, and his PSA has risen from 7 to 23 over the past 12 months. On examination his BP is 135/80 mmHg; pulse is 85/min and regular. He looks pale and is in pain from the fracture. He is very thin with a BMI of 19.5.

Investigations:

Hb	10.1 g/dl
WCC	9.1 x 10^9/l
PLT	181 x 10^9/l
Na^+	137 mmol/l
K^+	4.3 mmol/l
Creatinine	110 µmol/l

Which of the following is the most likely finding on bone profile?

A	Decreased P1NP
B	Decreased urinary CTX
C	Elevated alkaline phosphatase
D	Hypercalcaemia
E	Hypocalcaemia

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C Elevated alkaline phosphatase

Out of the options listed, elevated alkaline phosphatase is the best indirect marker of bony destruction from those listed. In this situation, bone scanning may be useful in assessing areas at risk of future fracture, for consideration of radiotherapy. Bisphosphonates have traditionally been used in the management of bone metastasis from prostate cancer; however, more recently, denosumab has been licensed, which obviates the requirement for frequent intravenous infusions while reducing the risk of skeletal related events.

E Hypocalcaemia

Hypocalcaemia is incorrect. Calcium levels are usually normal, not decreased, unless there is bed rest.

A Decreased P1NP

Decreased P1NP is incorrect. P1NP is increased in states of high bone turnover, such as the presence of bony metastases.

B Decreased urinary CTX

Decreased urinary CTX is incorrect. CTX is increased in states of high bone turnover, such as the presence of bony metastases.

D Hypercalcaemia

Hypercalcaemia is incorrect. Calcium levels are usually normal, not increased, unless there is severe dehydration or production of PTH-rp.

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4:59
3G

A 56-year-old gentleman with relapsed CLL is treated with fludarabine. Investigations:

Hb	5 g/dl
MCV	120 fl
WBC	140 x 10^9/l
PLT	110 x 10^9/l

As he is symptomatic a 3-unit blood transfusion is administered. Four days later he presents with increasing shortness of breath. The PO_2 is 89% on air and a chest X-ray shows shadowing at both hila.

Which one of the following is the most likely diagnosis?

A	Alveolar haemorrhage
B	Atypical pneumonia
C	*Pneumocystis jirovecii* infection
D	Pulmonary oedema
E	Transfusion-associated graft-versus-host disease

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5:00
3G

C *Pneumocystis jirovecii* infection

This man has been treated with a purine analogue in the form of fludarabine. This cytotoxic agent affects T-cell function. Patients are, therefore, prone to opportunistic infections including pneumocystis infection. Patients receiving purine analogues should also receive co-trimoxazole to reduce this risk.

D Pulmonary oedema

Pulmonary oedema is incorrect. The chest X-ray appearances are not classical for this.

A Alveolar haemorrhage

Alveolar haemorrhage is incorrect. The platelet count is satisfactory at 110 and there is nothing in particular to suggest this diagnosis.

B Atypical pneumonia

Atypical pneumonia is incorrect. Atypical pneumonia could be a possibility, but pneumocystis infection in the setting of fludarabine treatment is more common, particularly with the chest X-ray findings showing bi-hilar shadowing.

E Transfusion-associated graft-versus-host disease

Transfusion-associated graft-versus-host disease is incorrect. All patients who receive purine analogues are at risk of transfusion-associated graft-versus-host disease and therefore should receive irradiated blood products. The clinical features of transfusion-associated graft-versus-host disease are pancytopaenia, liver dysfunction, diarrhoea and rash, which is not the scenario that is present in this question.

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5:01
3G
On
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Which one of the following statements BEST describes haemophilia A?

A	Petechiae are more common than soft tissue bleeding
B	Bleeding time is prolonged
C	Factor 8 inhibitors occur in 10% of patients receiving multiple factor 8 transfusion
D	Iron deficiency anaemia is a frequent and persistent problem
E	Joint deformity is rare despite the fact that haemarthrosis is one of the main recurrent manifestations

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Previous Question Skip Question

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C	Factor 8 inhibitors occur in 10% of patients receiving multiple factor 8 transfusion

This can be a significant problem, mostly in severe haemophiliacs who are on prophylactic factor VIII infusions. This should be suspected if the factor VIII infusions are failing to resolve problematic bleeding in patients who have received multiple infusions in their life.

E	Joint deformity is rare despite the fact that haemarthrosis is one of the main recurrent manifestations

Joint deformities unfortunately are a significant complication of recurrent haemarthrosis.

A	Petechiae are more common than soft tissue bleeding

Petechiae are more common than soft tissue bleeding is incorrect. Soft tissue bleeding and muscle bleeds are presenting features of haemophilia A. Petechiaeare more common in platelet disorders.

B	Bleeding time is prolonged

The bleeding time is not prolonged in haemophilia. This is because the bleeding time is actually a measure of how well the platelets adhere to the damaged endothelium at the site of injury. Therefore the bleeding time is increased in Von Willebrand's disease, but not in haemophilia.

D	Iron deficiency anaemia is a frequent and persistent problem

Iron deficiency anaemia is not a frequent problem in haemophilia A, as there is very rarely gastrointestinal bleeding.

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Which one of the following statements regarding iron deficiency anaemia is MOST accurate?

A	It is commonly caused by dietary deficiency
B	Pins and needles in the hands and feet may indicate early peripheral neuropathy
C	Splenomegaly occurs in up to 50% of cases
D	Koilonychia is characteristic and rarely seen in other forms of anaemia
E	Reticulocyte count is often elevated

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Explanation

D	Koilonychia is characteristic and rarely seen in other forms of anaemia

Spoon-shaped nails (koilonychia) are characteristic and are rarely described in other forms of anaemia.

A	It is commonly caused by dietary deficiency

It is commonly caused by dietary deficiency is incorrect. Although dietary deficiency can play a role in iron deficiency, excessive blood loss, either as a result of gastrointestinal or menstrual blood loss, is more common.

B	Pins and needles in the hands and feet may indicate early peripheral neuropathy

Pins and needles in the hands and feet is incorrect. This is not the most accurate statement regarding iron deficiency and such symptoms not very common at all.

C	Splenomegaly occurs in up to 50% of cases

Splenomegaly is incorrect. This should not be associated with iron deficiency.

E	Reticulocyte count is often elevated

Reticulocyte count is often elevated is incorrect. The reticulocyte count is usually normal.

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An 18-year-old man comes to the Emergency Department for review. He has become increasingly short of breath over the past 48 h, and is concerned as he is passing dark brown urine. He has a history of deep vein thrombosis some 12 months earlier, for which he took warfarin for a 6-month period. On examination his BP is 105/80 mmHg, his pulse is 88/min and regular. He looks pale and is slightly short of breath. Investigations:

Hb	8.4 g/dl (reticulocytosis)
WCC	10.2 $x10^9$/l
PLT	104 $x10^9$/l
Na^+	138 mmol/l
K^+	4.9 mmol/l
Creatinine	100 micromol/l
LDH	620 U/l
Urine dipstick	+ to blood, no red cells seen on microscopy

Which of the following is the most effective intervention?

A Eculizumab

B Folic acid

C Iron supplementation

D Methotrexate

E [illegible]plone

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5:04
3G

Explanation

A	Eculizumab

Eculizumab is the most effective intervention. This is a difficult question. We are told that this man is passing dark brown urine. However, the urine dipstick is positive for blood; but when one looks down the microscope, no red blood cells are seen. This description is classical in the MRCP exams for a condition known as paroxysmal nocturnal haemoglobinuria (PNH). This is because this condition results in intravascular haemolysis.

Red blood cells are haemolysed within the circulation. Haemoglobin then passes through the kidneys into the urine. This free haemoglobin therefore results in a positive urine dipstick, but of course no red blood cells can be seen on the microscopy. As it is associated with haemolysis, there is an associated reticulocytosis. This is also associated with venous thrombotic events, as is the case in this question. Eculizumab is a monoclonal antibody that inhibits complement. This reduces the risk of haemolysis and further thrombosis in PNH. The provision of this specialised drug is through a national PNH team.

B	Folic acid

Folic acid is incorrect. Although folic acid is important in replacing folate stores that may become depleted because of ongoing haemolysis, eculizumab is a specific therapy to switch off the excessive complement activation that is seen in PNH.

C	Iron supplementation

Iron supplementation is incorrect. Iron supplementation has no specific role in PNH.

D	Methotrexate

Methotrexate is incorrect. Methotrexate has no specific role in PNH.

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A 78-year-old woman attends the Haematology Clinic for further investigation. She receives vitamin B_{12} injections every 3 months, having been diagnosed with pernicious anaemia 4 years ago. She is currently asymptomatic.

Her FBC shows;

Hb	10.3 g/dl
MCV	101 fl
Platelets	136 × 10^3/mm^3
WCC	3.9 × 10^3/mm^3

Other investigations show;

TSH	< 1.5 mU/litre
AST	39 U/litre
GGT	67 U/litre
INR	1.1

Which one of the following is the likely diagnosis?

A	Reticulocytosis
B	Macrocytosis in the absence of underlying pathology
C	Myelodysplastic syndrome
D	Thyroid dysfunction
E	Vitamin B_{12} deficiency

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5:07
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C	Myelodysplastic syndrome

This is an elderly lady who is clearly B_{12} replete because she has been having regular B_{12} injections. She now has a macrocytic anaemia, associated with a slight thrombocytopenia. The white cell count is a little bit on the low side too. She would therefore warrant a bone marrow examination to establish this diagnosis.

A	Reticulocytosis

Reticulocytosis is incorrect. One would expect the question to actually state the reticulocyte count,but it has not done so; thus it would be a brave move to suggest this diagnosis in the absence of this information.

B	Macrocytosis in the absence of underlying pathology

Macrocytosis in the absence of underlying pathology is incorrect. Macrocytosis in the absence of underlying pathology would not be an appropriate answer, because the patient is anaemic, and somewhat thrombocytopenic.

D	Thyroid dysfunction

Thyroid dysfunction is incorrect. This lady has a low TSH level suggesting hyperthyroidism. Hypothyroidism can cause a mild macrocytic anaemia.

E	Vitamin B_{12} deficiency

Vitamin B_{12} deficiency is incorrect. This lady is B_{12} replete, because she has been having B_{12} injections every 3 months.

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A 70-year-old lady who had a lumpectomy for breast carcinoma 20 years ago now presents with lower back pain. She has been feeling tired over the past few months, and takes ramipril for blood pressure but has had no other significant symptoms.

Investigations:

Hb	109 g/l
WCC	5.0 x 10^9/l
PLT	210 x 10^9/l
Plasma viscosity	2.25 mPa/s (1.50-1.72)
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	130 µmol/l
Ca corrected	2.7 mmol/l
Alkaline phosphatase	290 U/l
Total protein	62 g/l
Albumin	30 g/l
Bone scan	Normal

Given the likely diagnosis, which one of the following is the most appropriate investigation to assess the prognosis of her underlying disease?

A	HER-2 status
B	MR spine
C	S 2-microglobulin

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Investigations:

Hb	109 g/l
WCC	5.0 x 10^9/l
PLT	210 x 10^9/l
Plasma viscosity	2.25 mPa/s (1.50-1.72)
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	130 µmol/l
Ca corrected	2.7 mmol/l
Alkaline phosphatase	290 U/l
Total protein	62 g/l
Albumin	30 g/l
Bone scan	Normal

Given the likely diagnosis, which one of the following is the most appropriate investigation to assess the prognosis of her underlying disease?

A	HER-2 status
B	MR spine
C	Serum ß2-microglobulin
D	Serum PINP
E	Serum protein electrophoresis

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Explanation

C	Serum ß2-microglobulin

The International Scoring System (ISS) is used to assess prognosis in multiple myeloma, and uses the combination of serum ß2 macroglobulin and albumin to divide patients with myeloma into three risk categories. ISS stage I has the best prognosis, with stage III patients having the worst prognosis.

E	Serum protein electrophoresis

Serum protein electrophoresis is incorrect. Serum protein electrophoresis is clearly going to be an important investigation to determine that this lady does indeed have underlying multiple myeloma, but this of course does not give any prognostic information about the disease severity.

A	HER-2 status

HER-2 status is incorrect. The most likely diagnosis here is not relapsed breast carcinoma but multiple myeloma. One would expect the bone scan to be abnormal if there were osteolyticlesions due to metastatic breast carcinoma. Here the bone scan is normal, which is typically found in myeloma.

B	MR spine

MR spine is incorrect. MR spine clearly would be a very important investigation to determine the extent of the spinal disease, but this does not have an impact on the prognosis of myeloma.

D	Serum PINP

Serum PINP is incorrect. Serum PINP stands for procollagen end terminal propeptide and this is thought to be a serum marker of metastatic spread to the bone in breast cancer patients.

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A 45-year-old woman who is currently 4 weeks into a course of post-operative radiotherapy for locally advanced cervical carcinoma is admitted with abdominal pain and diarrhoea.

Which one of the following is the most likely cause of the clinical picture?

A	Bowel obstruction
B	Bowel perforation
C	Complication of surgery
D	Local malignant infiltration
E	Radiation enteritis

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Previous Question Skip Question

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E Radiation enteritis

This lady had abdominal pain and diarrhoea while receiving radiotherapy, so the current treatment is the most obvious cause for her bowel symptoms. The acute picture manifests as inflammation of the ileum and colon, with abdominal pain and diarrhoea. Maintaining adequate hydration is the mainstay of therapy.

A Bowel obstruction

Bowel obstruction is incorrect. Bowel obstruction is false, because she is undergoing radiotherapy at the time of her current problems.

B Bowel perforation

Bowel perforation is incorrect. Bowel perforation would present with abdominal pain, but not diarrhoea.

C Complication of surgery

Complication of surgery is incorrect. The clinical picture is unlikely to be due to a surgical complication given the time frame.

D Local malignant infiltration

Local malignant infiltration is incorrect. Local malignant infiltration to the bowel is most likely to present with obstruction, not with abdominal pain and diarrhoea.

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A 29-year-old white male with AML is in remission following a course of combination chemotherapy. He has some high-risk features and the decision is made that an allogeneic bone marrow transplant should be carried out. His serology is negative for cytomegalovirus (CMV). His tissue type is A1, A24, B8, B18.

Which one of the following relatives, all of whom are fit and healthy, would be the best donor?

A	His sister, A1, A24, B8, B18,CMV-positive
B	His brother A1, A24, B8, B18,CMV-positive
C	His sister, A1, A28, B8, B14, CMV-positive
D	His brother, A1, A24, B8, B18,CMV-negative
E	His sister A1, A24, B8, B18,CMV-negative

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Previous Question Skip Question

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Explanation

D	His brother, A1, A24, B8, B18,CMV-negative

The brother is fully matched at the antigens tested. The aim would be to choose a fully matched sibling who was also CMV-negative, as is the patient. In general, fully HLA matched, CMV matched male donors are preferred over fully HLA matched, CMV matched female donors.

A	His sister, A1, A24, B8, B18,CMV-positive

This option is incorrect because this sister is CMV positive.

B	His brother A1, A24, B8, B18,CMV-positive

This option is incorrect because this brother is CMV positive.

C	His sister, A1, A28, B8, B14, CMV-positive

This option is incorrect because there is antigen mismatching, as well as CMV mismatch.

E	His sister A1, A24, B8, B18,CMV-negative

This option is incorrect. Although the sister is matched at the antigens tested, male donors that are matched both at the antigen type and CMV type are preferred to antigen matched, CMV matched female donors. This is because of the increased risk of graft versus host disease in stem cell donations from female donors to male recipients.

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5:14
3G

A 46-year-old patient has been referred because of pyrexia of unknown origin. He has had pyrexia for the last month interrupted by short afebrile episodes. Blood cultures and an infection screen were both negative. On examination his temperature is 38°C and he has palpable, non-tender neck lymph nodes.

Which one of the following is the most important step in obtaining the diagnosis?

A	Blood cultures
B	Bone marrow biopsy
C	C-reactive protein
D	Erythrocyte sedimentation rate
E	Lymph node biopsy

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Previous Question | Skip Question

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E	Lymph node biopsy

Lymph node biopsy is the correct way to establish a diagnosis in this case. A full open biopsy with review by expert pathologist is required.

A	Blood cultures

Blood cultures is incorrect. We have already been told that his blood cultures are negative.

B	Bone marrow biopsy

Bone marrow biopsy is incorrect. We know this man has evidence of lymphadenopathy. The enlarged lymph node should be removed for histological analysis in the first instance. It should be noted that bone marrow involvement in Hodgkin's disease is rare.

C	C-reactive protein

C-reactive protein (CRP) is incorrect. CRP will not be helpful in obtaining a specific diagnosis.

D	Erythrocyte sedimentation rate

Erythrocyte sedimentation rate (ESR) is incorrect. ESR is important in the risk stratification of early stage Hodgkin's disease, but it will not be helpful in its own right in obtaining a diagnosis.

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A 45-year-old woman presents to the Emergency Department with sensory changes and lower leg weakness. She says that the symptoms have worsened rapidly over the past few days and she is now unable to stand. There is no past medical history of note and she takes no regular medication. Her BP is 144/82 mmHg, pulse is 78/min and regular. There is spastic paresis of the right lower limb, with reduced vibration and position sense on the right. There is loss of pain and temperature sensation affecting the left side below the level of T10.

Which of the following is the most likely diagnosis?

A	Ependymoma
B	Meningioma
C	Spinal stenosis
D	Spinal tuberculosis
E	Spondylosis

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Previous Question | Skip Question

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Explanation

B Meningioma

The clinical picture described here is consistent with Brown Séquard syndrome. This is due to damage to one half of the spinal cord resulting in paralysis and loss of proprioception ipsilaterally to the injury, and loss of pain and temperature sensation contralaterally. A number of causes exist, but the absence of other co-morbidities, and the progressive symptoms, fit best with a diagnosis of meningioma.

C Spinal stenosis

Lumbar spinal stenosis is most common, and leads to bilateral motor and sensory symptoms.

A Ependymoma

Ependymomas are associated with radiculopathy (nerve root symptoms).

D Spinal tuberculosis

Spinal tuberculosis can also present with Brown Séquard, although the absence of symptoms and signs of infection does not support a diagnosis of tuberculosis.

E Spondylosis

Spondylosis is more common in the cervical region and presents with back pain.

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Which one of the following is used as a prognostic marker in acute myeloblasticleukaemia?

A	Bone marrow karyotype
B	C-reactive protein
C	Monocytic morphology
D	Percentage of blasts in bone marrow
E	White cell count

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Previous Question | Skip Question

Calculator

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Explanation

A	Bone marrow karyotype

Bone marrow karyotype is the most important prognostic marker in acute myeloid leukaemia (AML).This essentially is cytogenetic analysis of the blast cells. Patients with certain genetic changes have a low risk of relapse, for example t(8:21) or chromosome 16 inversion.Conversely, patients with multiple cytogenetic abnormalities or changes in chromosome 5 or 7 have a higher risk of relapse.

B	C-reactive protein

C-reactive protein (CRP) is incorrect. CRP is not a useful prognostic marker in acute myeloid leukaemia.

C	Monocytic morphology

Monocytic morphology is incorrect. Monocytic morphology is not an established prognostic marker in AML.

D	Percentage of blasts in bone marrow

Percentage of blasts in bone marrow is incorrect. Once the diagnosis of acute myeloid leukaemia has been made by demonstrating greater than 20% blasts in the marrow, the fact that there is either, for instance, 30% or 80% blasts has no prognostic difference.

E	White cell count

White cell count is incorrect. White cell count is an i[illegible] marker of active disease in AML, with patients with a[illegible] white cell count greater than 100 having a higher risk of relapse. However, the bone marrow cytogenetics is the most important

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A 32-year-old woman presented with abdominal distension and malaise. She was found to have a malignant ovarian carcinoma which had metastasised to the peritoneum and was causing ascites. She will receive combination chemotherapy with cisplatin as part of her treatment for advanced ovarian carcinoma.

Which one of the following correctly describes the mode of action of cisplatin?

A	It inhibits protein synthesis
B	It is an epidermal growth factor receptor inhibitor
C	It is a small molecule kinase inhibitor
D	It is a topoisomerase inhibitor
E	It leads to cross-linking of DNA to form adducts

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Previous Question | Skip Question

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Annotation | Stop Share

5:19
3G

E	It leads to cross-linking of DNA to form adducts

The mode of action of cisplatin is to promote cross-linking of DNA to form DNA adducts. This leads to promotion of intracellular signalling via pathways such as p53, p73 and MAP kinase leading to increased cellular apoptosis.

Resistance to cisplatin may occur because of reduced cisplatin uptake by resistant cells or increased DNA adduct repair. Other mechanisms include loss of the p53-mediated pathway for programmed cell death.

Side-effects include nephrotoxicity, neurotoxicity, ototoxicity and particularly electrolyte disturbance, including hypomagnesaemia, hypokalaemia and hypocalcaemia.

A	It inhibits protein synthesis

It inhibits protein synthesis is incorrect. Inhibition of protein synthesis describes the mechanism of action of a group of cytotoxics known as antimetabolites, e.g. fluorouracil, which inhibit the synthesis of nucleic acids.

B	It is an epidermal growth factor receptor inhibitor

It is an epidermal growth factor receptor inhibitor is incorrect. Inhibition of epidermal growth factor receptor describes monoclonal antibodies such as cetuximab which target the epidermal growth factor receptor and are utilised when molecular testing demonstrates amplification of this receptor on the malignant cells.

C	It is a small molecule kinase inhibitor

It is a small molecule kinase inhibitor is incorrect. Inhibition of small molecule kinase describes molecularly targeted agents such imatinib and sunitinib, which inhibit tyrosine kinases that are pathologically stimulated in malignant cells.

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The haematology StR is contacted urgently about a woman who has attended an antenatal clinic that morning. She is 32 weeks' pregnant and has a blood pressure of 140/90 mmHg and mild proteinuria. Her pregnancy has been complicated by hyperemesis. At booking at 16-weeks' gestation, her blood results were:

Hb 11.2 g/dl, MCV 105 fl, MCH 30 pg (28–32), MCHC 32 g/dl (32–35), WCC 11.3 × 10^9/litre and platelets 237 × 10^9/litre.

Now at 32-weeks' gestation her blood results are: Hb 5.9 g/dl, MCV 118 fl, MCH 32 pg, MCHC 32 g/dl, WCC 6.4 × 10^9/litre and platelets 154 × 10^9/litre.

Which one of the following is the most likely cause of her anaemia?

A	ß-Thalassaemia trait
B	Retroplacental haemorrhage
C	Vitamin B12 deficiency
D	Folic acid deficiency
E	Aplastic anaemia

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Previous Question

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D	Folic acid deficiency

This pregnant lady has a macrocytic anaemia, with a normal white cell count and platelet count. As pregnancy causes an increased demand for folate, this is the likely reason that she has become folate deficient. Her folate intake may well have been further compromised by the hyperemesis.

A	ß-Thalassaemia trait

Beta-thalassaemia trait is incorrect. This usually causes a microcytic anaemia in patients of the appropriate ethnic group. Usually the MCH is also significantly reduced in this condition.

B	Retroplacental haemorrhage

Retro-placental haemorrhage is incorrect. Clinically there is nothing to suggest this in the question, and a sudden retro-placental haemorrhage would be unlikely to cause such a significant macrocytosis.

C	Vitamin B12 deficiency

Vitamin B12 deficiency is incorrect. It takes many years to become B12 deficient, as B12 stores in the body are very plentiful. There is nothing to suggest problems that may cause B12 deficiency such as pernicious anaemia or problems with absorption in the terminal ilium.

E	Aplastic anaemia

Aplastic anaemia is incorrect. Although this certainly can cause anaemia, one would also expect the white cell count and platelet count to be significantly reduced.

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5:20
3G

A patient underwent an 80-cm ileum resection for Crohn's disease 4 years ago; he now presents with anaemia. His haemoglobin is 6.8 g/litre and mean cell hemoglobin (MCH) is 38 pg. Mean corpuscular volume (MCV) is 89 fl.

Which one of the following is the most likely cause?

A	Impaired vitamin B12 absorption
B	Impaired iron absorption
C	Chronic bleeding after surgery
D	Haemolysis
E	Bacterial infection

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Previous Question | Skip Question

Calculator

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A	Impaired vitamin B12 absorption

He has had an ileal resection for Crohn's disease and now is anaemic. B12 is absorbed in the terminal ilium, and this is a well-recognised problem when the ilium has been resected.

B	Impaired iron absorption

Impaired iron absorption is incorrect. Iron is absorbed in the duodenum, not the terminal ilium.

C	Chronic bleeding after surgery

Chronic bleeding after surgery is incorrect. He had his operation 4 years ago, so this would be very unlikely.

D	Haemolysis

Haemolysis is incorrect. The fact that he has had an ileal resection points more towards B12 malabsorption.

E	Bacterial infection

Bacterial infection is incorrect. This man has had an ileal resection and, given his history, B12 malabsorption is much more likely.

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Next Question

Previous Question

Tag Question

Feedback

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5:22
٠٦:٢٢ 3G

A 56-year-old man during a screening test for abnormal skin pigmentation was found to have an elevated serum ferritin of 3246 µg/l. He drank modestly and had no history of jaundice. He was found to be homozygous for the C282Y mutation and was confirmed to have hereditary haemochromatosis. Regular weekly venesection was started.

Which one of these measures of iron is best used for monitoring his therapy?

A	Bone marrow haemosiderin quantification
B	Serum ferritin
C	Serum iron and total iron-binding capacity
D	Serum transferrin saturation
E	Zinc erythrocyte protoporphyrin (ZPP)

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Previous Question | Skip Question

Calculator

Normal Values

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B	Serum ferritin

This is a way of monitoring the response to venesection therapy. It is a simple test that is widely available. It is a reflection of iron stores, and therefore is the best way of monitoring the reduction of excessive body iron by venesection.

A	Bone marrow haemosiderin quantification

Bone marrow haemosiderin quantification is incorrect. Bone marrow haemosiderin quantification should be immediately discounted, as this is an invasive, painful examination that cannot be done on a repeated basis.

C	Serum iron and total iron-binding capacity

Serum iron and total iron-binding capacity is incorrect. The role of venesection is to reduce total body iron stores, and serum iron levels are not reflective of this.

D	Serum transferrin saturation

Serum transferrin saturation is incorrect. Serum transferrin saturation is used as a screening test for patients with suspected haemochromatosis, but the best way of monitoring a response to a venesection programme is by demonstrating a reduction in serum ferritin.

E	Zinc erythrocyte protoporphyrin (ZPP)

Zinc erythrocyte protoporphyrin (ZPP) is incorrect. This test is especially used in children to diagnose iron deficiency, but levels of ZPP are also raised in lead poisoning. This is not used for monitoring the response to venesection therapy.

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A 34-year-old patient with severe post-influenza staphylococcal pneumonia is admitted to the Intensive Therapy Unit. Unfortunately he deteriorates with renal failure and low-output cardiac failure with hypotension. He also has evidence of developing disseminated intravascular coagulation (DIC). His BP is 95/50 mmHg, pulse 105 bpm, on inotropic support.

Investigations:

Hb	108 g/l
WCC	15.2 x 10^9/l
PLT	74 x 10^9/l
Na^+	141 mmol/l
K^+	5.8 mmol/l
Creatinine	375 µmol/l

He was given protein C but then suffers an acute deterioration in his conscious level. When you see him, he is unconscious with bilateral increased tone, upgoing planters and very sluggish pupil reactions bilaterally.

Which one of the following is most likely to have happened?

A	Cavernous sinus thrombosis
B	Embolic stroke
C	Intracerebral abscess
D	Intracranial haemorrhage
E	Watershed stroke due to hypotension

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5:25
On
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D Intracranial haemorrhage

Activated protein C is also known as drotrecogin alpha. This man appears to have had a catastrophic cerebral event following the administration of activated protein C. This is now no longer used. It was used in severe sepsis, but evidence now suggests that this does not improve mortality, but it does increase bleeding risks. It is therefore likely that this man has unfortunately had an intracranial haemorrhage.

E Watershed stroke due to hypotension

Watershed stroke due to hypotension is incorrect. This man appears to have had a catastrophic cerebral event following the administration of activated protein C.

A Cavernous sinus thrombosis

Cavernous sinus thrombosis is incorrect. This man appears to have had a catastrophic cerebral event following the administration of activated protein C.

B Embolic stroke

Embolic stroke is incorrect. This man appears to have had a catastrophic cerebral event following the administration of activated protein C.

C Intracerebral abscess

Intracerebral abscess is incorrect. This man appears to have had a catastrophic cerebral event following the administration of activated protein C.

Annotation
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Audio
Video
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More

5:26
3G

A patient with end-stage renal failure presents with worsening anaemia.

Which one of the following is the most likely cause?

A	Erythropoietin deficiency
B	Folate deficiency
C	Granulocyte colony-stimulating factor deficiency
D	Iron deficiency
E	Pyridoxine deficiency

43697

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Previous Question | Skip Question

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A	Erythropoietin deficiency

Patients with end-stage renal failure do not produce erythropoietin normally, and they often need erythropoietin supplementation to raise their haemoglobin levels.

B	Folate deficiency

Folate deficiency is incorrect. Folate deficiency is not particularly linked to end-stage renal failure.

C	Granulocyte colony-stimulating factor deficiency

Granulocyte colony-stimulating factor (GCSF) deficiency is incorrect. Granulocyte colony-stimulating factor deficiency has got nothing to do with end-stage renal failure. GCSF can be given by subcutaneous injection following intensive chemotherapy to stimulate neutrophil recovery, but this does not have anything to do with red cells.

D	Iron deficiency

Iron deficiency is incorrect. Iron deficiency can occur in end-stage renal patients, and indeed patients need to be iron replete before starting erythropoietin supplements. However, erythropoietin deficiency is the major cause of anaemia in patients with end-stage renal failure.

E	Pyridoxine deficiency

Pyridoxine deficiency is incorrect. Pyridoxine deficiency is not specifically associated with end-stage renal failure. Pyridoxine is one form of vitamin B6.

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5:27
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A 72-year-old man comes to the clinic for review. He has been suffering from increasingly severe fatigue over the course of the past few months. His brother was recently diagnosed with myelofibrosis and he is concerned that he may have the same thing.

Which one of the following is the most common symptom at presentation of myelofibrosis?

A	Fatigue
B	Left upper quadrant pain
C	Night sweats
D	Thrombosis
E	Weight loss

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Previous Question | Skip Question

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Annotation
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Audio
Video
Share
Participants
More

A 72-year-old man comes to the clinic for review. He has been suffering from increasingly severe fatigue over the course of the past few months. His brother was recently diagnosed with myelofibrosis and he is concerned that he may have the same thing.

Which one of the following is the most common symptom at presentation of myelofibrosis?

Your answer was correct

A	Fatigue
B	Left upper quadrant pain
C	Night sweats
D	Thrombosis
E	Weight loss

Explanation

A	Fatigue

In most patients, the onset of myelofibrosis is insidious, with gradually increasing fatigue the most common finding.

B	Left upper quadrant pain

Left upper quadrant pain is incorrect. In more advanced dis this can be a problem from splenic enlargement.

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A 30-year-old patient presents with an episode of jaundice associated with feeling tired. On examination there is anaemia, splenomegaly and jaundice. He has had several such episodes in the past. The blood smear shows reticulocytosis and the red cells demonstrate increased osmotic fragility.

Given the probable diagnosis, which one of the following is likely to be the most successful treatment?

A	Blood transfusion
B	Bone marrow transplantation
C	Chemotherapy
D	Radiotherapy
E	Splenectomy

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Previous Question | Skip Question

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E	Splenectomy

This man is likely to have the inherited condition hereditary spherocytosis. Red cells are more spherical and, because of this, they are unable to pass through the splenic micro-circulation where they are destroyed. Splenectomy therefore is the principal form of treatment, although this should not be performed unless clinically indicated, eg significant, recurrent anaemia or gall stones. This is because of the risk of post-splenectomy sepsis, particularly in early childhood.

A	Blood transfusion

Blood transfusion is incorrect. This can be given to patients to support them through a haemolytic crisis, but it could not be regarded as a long-term therapy.

B	Bone marrow transplantation

Bone marrow transplantation is incorrect. Bone marrow transplantation is not used routinely for patients with hereditary spherocytosis.

C	Chemotherapy

Chemotherapy is incorrect. Chemotherapy is not used routinely for patients with hereditary spherocytosis.

D	Radiotherapy

Radiotherapy is incorrect. Radiotherapy again is not used routinely for the t nt of hereditary spherocytosis.

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4:26
3G

A 60-year-old white man comes to see you because he was told he had 'a high blood count'. Physical exam is normal except for a ruddy complexion, which he says he has had most of his adult life. He has smoked two packs of cigarettes per day since he was 16 years old. A blood screen shows a normal white blood cell (WBC) count and differential, normal platelet count, haemoglobin of 184 g/l and a haematocrit of 57%. Redcell volume is elevated, erythropoietin levels are low and leukocyte alkaline phosphatase score is high, suggesting primary polycythaemia.

Which one of the following statements fits best with primary polycythaemia?

A	Administration of radioactive phosphorous carries no increased risk of leukaemia
B	Around 10% of cases progress to acute myeloblastic leukaemia
C	Around 50% of cases progress to myelofibrosis
D	H2-receptor antagonists may be useful in relieving itching
E	Venesection is only used where chemotherapy has failed

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Annotation
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Previous Question
Skip Question

Calculator
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DU Recorder

D	H2-receptor antagonists may be useful in relieving itching

H2 receptor antagonists are occasionally effective for this, and this is somewhat surprising. Conventionally it is the H1 antagonists that tend to be used for pruritus in other settings.

A	Administration of radioactive phosphorous carries no increased risk of leukaemia

Administration of radioactive phosphorous carries no increased risk of leukaemia is incorrect. Radioactive phosphorous does indeed carry an increased risk of progression to acute myeloid leukaemia and is therefore only reserved for more elderly patients.

B	Around 10% of cases progress to acute myeloblastic leukaemia

Around 10% of cases progress to acute myeloblastic leukaemia is incorrect. Progression to acute myeloid leukaemia is seen in around5% of patients.

C	Around 50% of cases progress to myelofibrosis

Around 50% of cases progress to myelofibrosis is incorrect. Progression to myelofibrosis is less than 30%.

E	Venesection is only used where chemotherapy has failed

Venesection is only used where chemotherapy has failed is incorrect. Venesection is a very important aspect of the management of primary polycythaemia.

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A young woman is pregnant for the first time. Her father is known to have glucose-6-phosphate dehydrogenase deficiency, which manifests as occasional mild episodes of acute intravascular haemolysis. She asks about the likelihood of her baby being born with the disease.

Which one of the following is most likely?

A	If affected, the baby should undergo splenectomy early in life
B	If affected, the baby will have neonatal jaundice
C	If the child is a boy, he will have a 50% chance of having the disease
D	If the child is a girl, she will not have clinical disease
E	The baby is never at risk of neonatal jaundice

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Previous Question Skip Question

Calculator

Normal Values

Annotation Stop Share

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Question 4 of 326

Some 3 months after completing a course of chemotherapy comprising cisplatin, bleomycin and etoposide for testicular cancer, a 24-year-old smoker presents with exertional dyspnoea, wheezing and a persistent non-productive cough. On examination there are fine bilateral basal crackles.

Which one of the following is the most likely diagnosis?

A	Bleomycin toxicity
B	Idiopathic pulmonary fibrosis
C	Lung metastases
D	Multiple pulmonary embolisms
E	Tuberculosis

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Previous Question | Skip Question

Calculator

Normal Values

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A	Bleomycin toxicity

Testicular cancer is the most common solid tumour in men between 15 and 35 years of age. It is highly chemosensitive, and even disseminated testicular cancer has an 80% cure rate. Cisplatin is the mainstay of treatment and standard combinations usually include cisplatin, bleomycin and etoposide. Owing to the high cure rate, the issue of long-term complications from chemotherapy (survivorship) becomes important.

Chronic lung damage secondary to bleomycin is rare but important as it can progress to pulmonary fibrosis and death. Bleomycin-induced pneumonitis usually occurs during therapy but can occur up to 6 months after therapy. Dyspnoea on exertion and non-productive cough are usually the earliest symptoms. Fine basal crepitations are a typical finding. Infective pneumonitis is the most important differential diagnosis. Although risk factors include smoking and thoracic radiation, the total drug dose is the most important factor.

B	Idiopathic pulmonary fibrosis

Idiopathic pulmonary fibrosis is incorrect. The young age of the patient would make idiopathic pulmonary fibrosis unlikely.

C	Lung metastases

Lung metastases is incorrect. The clinical symptoms and signs would be less suggestive of metastases, although these need to be excluded.

D	Multiple pulmonary embolisms

Multiple nary embolisms (PEs) is incorrect. The clinical signs would be less suggestive of multiple PEs, although these need to be excluded.

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DU Recorder

patient would make idiopathic pulmonary fibrosis unlikely.

C Lung metastases

Lung metastases is incorrect. The clinical symptoms and signs would be less suggestive of metastases, although these need to be excluded.

D Multiple pulmonary embolisms

Multiple pulmonary embolisms (PEs) is incorrect. The clinical symptoms and signs would be less suggestive of multiple PEs, although these need to be excluded.

E Tuberculosis

Tuberculosis is incorrect. There is nothing in the history to suggest tuberculosis, which would more commonly be associated with a productive cough, fevers and weight loss.

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DU Recorder

A 54-year-old Middle Eastern man of Bedouin Arab origin is referred to the Haematology Clinic. He has been noted by his GP to have low neutrophil counts on three separate occasions over the last 6 months. He is completely well and takes no medications. Physical examination is entirely normal.

Investigations:

Hb	130 g/l
MCV	94.0 fl
WCC	5.4 x 10^9/l
Neutrophils	1.7 x 10^9/l
PLT	182 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	110 micromol/l
ESR	13 mm/1st hour

Which of the following is the most likely diagnosis?

A	Benign neutropaenia
B	Myelodysplasia
C	Myelofibrosis
D	Sickle cell trait
E	Thalassaemia minor

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Explanation

A	Benign neutropaenia

This Middle Eastern man has a borderline neutropaenia. Note that this is termed an isolated neutropaenia, because the haemoglobin and platelet count is normal. This cannot be attributed to drugs, as he is on no medication. This isa persistent finding, as his GP has sensibly performed three separate blood counts over the last 6 months. Neutropaenia is really only defined when the neutrophil count is less than 1.5 persistently, and is often found in certain racial groups, particularly people from West Africa. Benign neutropaenia is therefore alternatively termed racial neutropaenia.

B	Myelodysplasia

Myelodysplasia is incorrect. This man is not anaemic and has a normal platelet count, associated with a normal MCV. This would be against the diagnosis of myelodysplasia.

C	Myelofibrosis

Myelofibrosis is incorrect. Myelofibrosis usually causes cytopaenias, particularly anaemia and there is no suggestion of splenomegaly on physical examination, which is a usual finding in myelofibrosis.

D	Sickle cell trait

Sickle cell trait is incorrect. Sickle cell trait generally causes a very mild anaemia and usually has no impactupon the white cells.

E	Thalassaemia minor

Thalassaemia minor is incorrect. Thalassaemia minor generally causes a mild anaemia and usually has no impact upon the white ce

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7:18
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A 55-year-old man presents with malaise, fevers and weight loss. He is found to have widespread malignancy, and molecular testing of the cancerous cells reveals the presence of a *bcr/abl* translocation.

What is the significance of the *bcr/abl* translocation?

A	It acts on stem cell line in the DNA
B	It blocks apoptosis
C	It codes for production of a tyrosine kinase
D	It increases expression of G-CSF (granulocyte colony stimulating factor) receptors
E	It increases production of G-CSF

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Previous Question Skip Question

Calculator

Normal Values

Annotation Stop Share
Audio Video Share Participants More

On
738-627-5670
Question 2 of 286
Leave

C	It codes for production of a tyrosine kinase

The *bcr/abl* fusion gene codes for the production of a protein which is a tyrosine kinase. Tyrosine kinases are enzymes that attach phosphate groups to other proteins, often activating them. The fusion is created by a reciprocal translocation between chromosomes 9 and 22, and is also known as the 'Philadelphia chromosome'.

The *bcr/abl* tyrosine kinase inhibitors such as imatinib are first-line therapy for patients with chronic myeloid leukaemia (CML), of which 90% are associated with bcr-abl translocation.

A	It acts on stem cell line in the DNA

It acts on stem cell line in the DNA is incorrect. bcr/abl does not affect stem cell or embryonic DNA.

B	It blocks apoptosis

It blocks apoptosis is incorrect, although many other cancer-causing mutations result in the inhibition of apoptosis (such as the tumour suppressor gene p53).

D	It increases expression of G-CSF (granulocyte colony stimulating factor) receptors

It increases expression of G-CSF (granulocyte colony stimulating factor) receptors is incorrect. bcr/abl has no effect on the production of granulocyte colony stimulating factor despite being associated with malignant overproduction of leucocytes in CML.

E	It increases production of G-CSF

It increases production of G-CSF is incorrect. bcr/abl has no effect on the [illegible]ion of granulocyte colony stimulating factor despite being associated with malignant overproduction of leucocytes in

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Audio
Video
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Participants
More

7:19
On
738-627-5670

A 42-year-old man from West Africa has recently begun dapsone therapy. He presents to the Emergency Department with anxiety, confusion, headache and shortness of breath at rest. He has no other past medical history of note. His BP is 110/70 mmHg, pulse is 90 bpm and regular. He has pale sclera. Saturation is measured at 89% on pulse oximetry.

You suspect he has methaemoglobinaemia.

Which one of the following is the most likely cause?

A	Binding of Fe^{2+} to a sulfonate complex
B	Oxidation of Fe+ to Fe2+
C	Oxidation of Fe2+ to Fe3+
D	Reduction of Fe^{2+} to Fe^{+}
E	Reduction of Fe^{3+} to Fe^{2+}

47225

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Previous Question Skip Question

Calculator

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Explanation

C	Oxidation of Fe2+ to Fe3+

This is what occurs in methaemoglobinaemia. The iron in haemoglobin is normally the ferrous Fe^{2+} form. In methaemoglobinaemia, this is oxidised to the inactive ferric Fe^{3+} form. Dapsone can act as an oxidising agent. There is a high prevalence of glucose-6 dehydrogenase deficiency in patients from West Africa.This may therefore result in increased oxidisation of the iron-containing component of haemoglobin, from Fe^{2+} to Fe^{3+}.

A	Binding of Fe^{2+} to a sulfonate complex

Binding of Fe^{2+} to a sulfonate complex is incorrect. Oxidation of Fe^{2+} to Fe^{3+} is what occurs in methaemoglobinaemia.

B	Oxidation of Fe+ to Fe2+

Oxidation of Fe^{+} to Fe^{2+} is incorrect. Oxidation of Fe^{2+} to Fe^{3+} is what occurs in methaemoglobinaemia.

D	Reduction of Fe^{2+} to Fe^{+}

Reduction of Fe^{2+} to Fe^{+} is incorrect. Oxidation of Fe^{2+} to Fe^{3+} is what occurs in methaemoglobinaemia.

E	Reduction of Fe^{3+} to Fe^{2+}

Reduction of Fe^{3+} to Fe^{2+} is incorrect. It is the normal Fe^{2+} form that is oxidised to Fe^{3+} in methaemoglobinaemia.

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Next Question

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7:20

A 41-year-old man presents with a neck lump, weight loss and night sweats. On examination, you note he has hepatomegaly.

Which one of the following is the likeliest diagnosis?

A	High-grade B-cell non-Hodgkin's lymphoma
B	High-grade T-cell non-Hodgkin's lymphoma
C	Hodgkin's disease
D	Large-cell lung carcinoma
E	Low-grade non-Hodgkin's lymphoma

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Previous Question | Skip Question

Calculator

Normal Values

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Explanation

A	High-grade B-cell non-Hodgkin's lymphoma

High-grade B-cell non-Hodgkin's lymphoma is the commonest type of high-grade lymphoma. It can be associated with B-symptoms such as weight loss and night sweats.

C	Hodgkin's disease

Hodgkin's disease is incorrect. We are told that he has a neck lump, as well as hepatomegaly,so this would indicate disease above and below the diaphragm, ie at least stage III disease.This is unusual in Hodgkin's disease.

B	High-grade T-cell non-Hodgkin's lymphoma

High-grade T-cell non-Hodgkin's lymphoma is incorrect. T-cell lymphomas are very rare, with high-grade B-cell non-Hodgkin's lymphoma being much more common.

D	Large-cell lung carcinoma

Large-cell lung carcinoma is incorrect. There is nothing in the history to particularly suggest thisas a diagnosis, such as a prolonged smoking history.

E	Low-grade non-Hodgkin's lymphoma

Low-grade non-Hodgkin's lymphoma is incorrect. Low-grade non-Hodgkin's lymphoma would be less likely to cause these symptoms.

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7:22

A 39-year-old man has type-1 diabetes and end-stage renal failure requiring haemodialysis. He has an O positive blood group. You are trying to find an appropriate kidney donor for him.

Which one of the following would be the most appropriate blood group of a potential kidney donor for him?

A	A+
B	A-
C	AB+
D	B+
E	O+

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Previous Question | Skip Question

Calculator

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Annotation Stop Share
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Explanation

E O+

O positive is the best answer here. We are told that the recipient of the potential kidney donation is O positive. This means he will have anti-A and anti-B antibodies in his blood. As such, transplanting a kidney from an AB, A or B donor is likely to lead to rejection.

A A+

A+ is incorrect. An A positive donor is likely to result in rejection.

B A-

A- is incorrect. An A negative donor is likely to result in rejection.

C AB+

AB+ is incorrect. An AB positive donor is likely to result in rejection.

D B+

B+ is incorrect. A B positive donor is likely to result in rejection.

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Next Question

Tag Question
Feedback
End Session
Annotation
Stop Share
Audio
Video
Share
Participants
More
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A 22-year-old woman is referred to the Emergency Department by her GP. She has been suffering extensive bleeding from her gums and bruising affecting her arms and legs after only minor trauma. Routine blood tests arranged by her GP show blast cells with evidence of disseminated intravascular coagulation (DIC), and a diagnosis of acute promyelocytic leukaemia (APML) is made.

Which of the following is the key initial therapy in APML?

A	All-trans retinoic acid (ATRA)
B	Arsenic trioxide
C	Cytarabine
D	6-mercaptopurine
E	Methotrexate

37128

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Previous Question | Skip Question

Calculator

Normal Values

Annotation Stop Share

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A	All-trans retinoic acid (ATRA)

All-trans retinoic acid (ATRA) causes immature promyelocytes to mature, alleviating the symptoms of DIC. It is usually combined with an anthracycline (daunorubicin or idarubicin).

B	Arsenic trioxide

Arsenic trioxide is incorrect. It is an oxide of arsenic. In patients who cannot tolerate anthracyclines, arsenic trioxide may be used as an alternative. It can be used as a cytostatic because it results in cells undergoing apoptosis.

C	Cytarabine

Cytarabineis incorrect. It is an antimetabolite that blocks DNA polymerase. This is an alternative drug which can be combined with ATRA as opposed to anthracycline. Anthracyclines can very cardio-toxic, and in such scenarios cytarabine can be a viable option

D	6-mercaptopurine

6-mercaptopurine is incorrect. 6-mercaptopurine is an option for low-dose maintenance therapy in combination with ATRA, given for at least a year in some cases. It is a thiopurine antimetabolite and is also used in the treatment of ulcerative colitis and Crohn's disease. This case describes an acute scenario with ongoing bleeding, and therefore immediate treatment is needed.

E	Methotrexate

Methotrexate is incorrect. Methotrexate is an option for low-dose maintenance therapy in combination with ATRA, given for at least a year in some cases. This case describes an acute scenario with ongoing bleeding and therefore immediate treatment is needed.

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A 26-year-old woman with a history of factor V Leiden mutation presents to the Emergency Department with left sided pleuritic chest pain, O_2 saturation of 91%, BP of 90/60 mmHg, and tachycardia at 100 BPM. The medical personnel elect to thrombolyse her but the alteplase is given as a single rapid IV bolus rather than as a 2hr infusion. Within a few minutes she begins to bleed profusely from her rectum and has a larger upper GI haemorrhage. Her BP falls to 75/50 mmHg.

Which of the following is likely to be most effective in reversing the systemic effects of Alteplase?

A	FFP
B	Protamine sulphate
C	Prothrombin complex concentrate
D	Tranexamic acid
E	Vitamin K

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Previous Question | Skip Question

Calculator

Normal Values

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Explanation

D	Tranexamic acid

The correct answer is Tranexamic acid (Option D).

Tranexamic acid is an antifibrinolytic compound, which is a potent competitive inhibitor of the activation of plasminogen to plasmin. At much higher concentrations it is a non-competitive inhibitor of plasmin. For these reasons it is the most appropriate initial option here.

C	Prothrombin complex concentrate

Prothrombin complex concentrate (Option C) is incorrect. Prothrombin complex concentrate is used for acute reversal of the effects of warfarin.

A	FFP

FFP (Option A) is incorrect. Although replacement may be required it is not a specific antifibrinolytic.

B	Protamine sulphate

Protamine sulphate (Option B) is incorrect. Protamine sulphate is a drug for heparin reversal.

E	Vitamin K

Vitamin K (Option E) is incorrect. Vitamin K is used for reversal of warfarin.

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A 73-year-old man with chronic lymphocytic leukaemia (CLL) is followed up in clinic. He has become increasingly breathless over the last 3 months but has no other symptoms and is on no medication. On examination, he is pale and has bilateral cervical and inguinal lymphadenopathy and a firm 5-cm splenomegaly. Full blood count shows:

Hb	74 g/l
WCC	25 × 10^3/mm^3
Platelets	117 × 10^3/mm^3
Urea	15 mmol/litre
Creatinine	140 µmol/litre
Bilirubin	49 µmol/litre

Which investigation is most appropriate to demonstrate the likely cause of anaemia?

A	Bone marrow aspirate
B	Auto-antibody profile
C	Erythropoietin level
D	Antiglobulin test
E	Urinary haemosiderin

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D	Antiglobulin test

This man has known CLL and he has become increasingly anaemic. The other key investigation to note there is that his bilirubin is raised. Therefore Anti-globulin test (also known as the Coombs' test) is the correct answer. CLL is associated with auto-immune haemolytic anaemia, which will result in a positive Coombs' test, raised reticulocytes, raised unconjugated bilirubin and a raised LDH level.

A	Bone marrow aspirate

Bone marrow aspirate is incorrect –when it says the 'most appropriate' investigation, this usually means the quickest and least invasive. This therefore should indicate that a bone marrow aspirate would not be the first investigation.

B	Auto-antibody profile

An auto-antibody profile is incorrect. An auto-antibody profile will not help here, because essentially it has got nothing to do with CLL.

C	Erythropoietin level

Erythropoietin level is incorrect. Erythropoietin level is just a complete red herring and again will not help in diagnosing a possible underlying haemolytic complication of CLL.

E	Urinary haemosiderin

Urinary haemosiderin is incorrect. Urinary haemosiderin will be unhelpful. This is a difficult test to perform reliably, and usually only indicates intravascular haemolysis, which is not seen in auto-immune haemolytic anaemia. In this condition, the site of destruction of the red blood cells is within the spleen.

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You are reviewing a 45-year-old woman with chronic myeloid leukaemia (CML). You note that she is Philadelphia chromosome positive and you remember that this represents the BCR-ABL gene.

What does the BCR-ABL gene code for?

A	Alkaline phosphatase
B	Epidermal growth factor
C	Serine protease
D	Tyrosine kinase
E	Xanthine oxidase

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C Serine protease

D Tyrosine kinase

E Xanthine oxidase

Explanation

D Tyrosine kinase

The BCR-ABL gene codes for a tyrosine kinase in chronic myeloid leukaemia. The ABL oncogene on chromosome 9 is moved to the BCR gene on chromosome 22. This results in an increased tyrosine kinase activity. Drugs that inhibit this tyrosine kinase inhibitor are now used in the treatment of chronic myeloid leukaemia, in particular imatinib.

A Alkaline phosphatase

Alkaline phosphatase is incorrect. The BCR-ABL gene codes for a tyrosine kinase in chronic myeloid leukaemia.

B Epidermal growth factor

Epidermal growth factor is incorrect. The BCR-ABL gene codes for a tyrosine kinase in chronic myeloid leukaemia.

C Serine protease

Serine protease is incorrect. The BCR-ABL gene codes for a tyrosine kinase in chronic myeloid leukaemia.

E e oxidase

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A patient has been diagnosed with von Willebrand's disease.

Which one of the following is the most likely blood abnormality?

A	Increased factor VIII level
B	Increased INR
C	Partial deficiency of von Willebrand factor
D	Prolonged activated partial thromboplastin
E	Reduced factor IX levels

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Explanation

C | Partial deficiency of von Willebrand factor

Partial deficiency of von Willebrand factor will be the most likely blood abnormality.

D | Prolonged activated partial thromboplastin

Prolonged activated partial thromboplastin is incorrect. Often von Willebrand's disease is a very mild condition, which does not result in a prolonged APTT.

A | Increased factor VIII level

Increased factor VIII level is incorrect. Reduced factor VIII levels may be seen in von Willebrand's disease, because von Willebrand's factor acts in a protective function to protect factor VIII in the circulation from degradation.

B | Increased INR

Increased INR is incorrect. Although von Willebrand's disease may sometimes increase the activated partial thromboplastin time, it does not increase the INR.

E | Reduced factor IX levels

Reduced factor IX levels is incorrect. Reduced factor IX levels is false, because von Willebrand's disease has nothing to do with factor IX.

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A 38-year-old woman presents with painful swelling of her left arm. Venography shows occlusion of her left subclavian vein. Her only previous medical history is of three spontaneous miscarriages. Her haematological investigations before treatment were as follows: Hb 13.2 g/dl, WCC 7.4 × 10^9/l, with a normal differential, platelets 123 × 10^9/l, PT 16 s (normal range 12–17), APTT 44 s (normal range 24–38), TT 17 s (normal range 14–22) and fibrinogen 2.4 g/l (normal range 2–5).

Which one of the following is the most likely cause of her thrombotic problem?

A	Antiphospholipid antibody syndrome
B	Autoimmune thrombocytopenia
C	Factor V Leiden mutation
D	Primary thrombocythaemia
E	Von Willebrand's disease

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Previous Question Skip Question

Calculator

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7:29

Explanation

A	Antiphospholipid antibody syndrome

This may be diagnosed in the presence of arterial venous thrombosis, other clinical situations such as recurrent miscarriage in the presence of positive laboratory tests for the antiphospholipid antibody. This lady has had a thrombotic event at an unusual site in the left subclavian vein in the presence of three spontaneous miscarriages. Antiphospholipid antibody syndrome can also be associated with thrombocytopenia, which is seen here. APTT is slightly raised, suggesting antiphospholipid antibody in addition.

B	Autoimmune thrombocytopenia

Auto-immune thrombocytopenia is incorrect. This pre-disposes to bleeding, not thrombotic events, and would not be associated with coagulation disorders such as a raised APTT that is seen in this situation.

C	Factor V Leiden mutation

Factor V Leiden mutation is incorrect. This would not be associated with a prolonged APTT and is not classically associated with recurrent miscarriages.

D	Primary thrombocythaemia

Primary thrombocythaemia is incorrect. The platelet count here is actually reduced, not increased, which occurs in essential thrombocythaemia.

E	Von Willebrand's disease

Von Willebrand's disease is incorrect. Although this may increase the APTT, it will of course pre-dispose to bleeding rather than

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The advent of targeted anti-cancer therapies has revolutionised treatment of many malignancies. Following the paradigm of personalised medicine, molecular testing of tumours is now routine in order to identify specific genetic alterations predictive of response to particular therapies.

Which of the following neoplasms most frequently responds to specific tyrosine kinase inhibitors?

A	Acute lymphocytic leukaemia
B	Acute myeloid leukaemia
C	Chronic lymphocytic leukaemia
D	Gastrointestinal stromal tumours
E	Multiple myeloma

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Previous Question | Skip Question

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D	Gastrointestinal stromal tumours

Specific tyrosine kinase inhibitors were developed after it was recognised that the Philadelphia chromosome (translocation 9:22) was associated with bcl-abl tyrosine kinase overexpression. STI571, later known as iniminitab mesylate (Gleevec), was therefore designed to treat chronic myeloid leukaemia (CML), but it was also found to be effective in gastrointestinal stromal tumours (GIST) - previously known as leiomyosarcoma. The high prevalence of the brc-able translocation in GIST and CML (approximately 90%) means that management has been revolutionised by the introduction of targeted therapies such as imatinib.

A	Acute lymphocytic leukaemia

Acute lymphocytic leukaemia is incorrect. Acute lymphocytic leukaemia may be suitable for treatment with targeted therapies but not in such large proportions.

B	Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. Acute myeloid leukaemia may be suitable for treatment with targeted therapies but not in such large proportions.

C	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. Chronic lymphocytic leukaemia may be suitable for treatment with targeted therapies but not in such large proportions.

E	Multiple myeloma

Multiple myeloma is incorrect. Multiple myeloma may be suitable for treatment with targeted therapies but not in such large proportions.

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A young woman presents at 34/40 weeks of pregnancy with copious vaginal bleeding. Her blood tests show;

platelets	20
Hb	5.6
APTT	72
PT	16.1
fib	0.4

Which one of the following is the most important step in management of this patient?

A	Delivery of the fetus
B	Give FFP
C	Give platelets
D	Intravenous heparin
E	Transfuse 2 units of O negative blood

46333

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Explanation

A	Delivery of the fetus

Delivery of the fetus is the most important step in the management of this young woman. She is reaching the end of her pregnancy, and now presents with copious vaginal bleeding. This suggests a major obstetric emergency such as placental abruption. She is anaemic, and thrombocytopaenic with low fibrinogen levels. All of this suggests disseminatedintravascular coagulation (DIC). Of course the patient should be supported with blood products to reduce the bleeding, but in general, the most important step in the managementof DIC is to reverse the underlying cause.

E	Transfuse 2 units of O negative blood

Transfuse 2 units of O negative blood is incorrect. Transfusing O negative flying squad blood will also be important. The most important step, however, is delivery of the fetus.

B	Give FFP

Give FFP is incorrect. FFP is required while planning to deliver the fetus. This is to replace deficient coagulation factors. The most important step, however, is delivery of the fetus.

C	Give platelets

Give platelets is incorrect. Giving platelets will also be required to raise the platelet count to greater than 50 or even 75 × 10^9/l. The most important step, however, is delivery of the fetus.

D	Intravenous heparin

Intraver parin is incorrect. Intravenous heparin would definite e appropriate given that she is bleeding very heavily and this will make it worse.

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A 58-year-old patient has been complaining of feeling unwell for the last 6 months. He complains of night sweats and weight loss. Molecular analysis of the peripheral blood film shows a reciprocal t(9;22) chromosome translocation.

Which one of the following is the most likely diagnosis?

A	Acute lymphocytic leukaemia
B	Acute myeloblastic leukaemia
C	Chronic lymphocytic leukaemia
D	Chronic myeloid leukaemia
E	Myeloma

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Previous Question | Skip Question

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7:35

Acute myeloblastic leukaemia is incorrect. Acute myeloid leukaemia is not associated with t(9;22).

C	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. Chronic lymphocytic leukaemia (CLL) is not associated with this translocation.

E	Myeloma

Myeloma is incorrect. Myeloma is not associated with this translocation.

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Which one of the following statements is true about folic acid deficiency?

A	Because of the high folate body stores, it will take more than 2 years for megaloblastic anaemia to develop after complete cessation of folic acid intake
B	Methotrexate-induced folic acid deficiency is corrected by concomitant folic acid therapy
C	Intestinal bacterial overgrowth is regarded as one of the common causes
D	Causes abnormal neurological findings indistinguishable from that associated with B12 deficiency
E	Responsible for neural tube defect in the fetus

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Previous Question Skip Question

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7:36
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Question 15 of 286
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E	Responsible for neural tube defect in the fetus

Folic acid is certainly responsible for neural tube defects in the fetus, and it is recommended that pregnant women take supplementary folic acid in the early stages of pregnancy.

A	Because of the high folate body stores, it will take more than 2 years for megaloblastic anaemia to develop after complete cessation of folic acid intake

Because of the high folate body stores, it will take more than 2 years for megaloblastic anaemia to develop after complete cessation of folic acid intake is incorrect. It does not take a long time to become folate deplete, because of the limited amount of folate the body stores. This is therefore quite common in elderly patients with a poor diet.

B	Methotrexate-induced folic acid deficiency is corrected by concomitant folic acid therapy

Methotrexate-induced folic acid deficiency is incorrect. Folinic acid rather than folic acid effectively counteracts the action of methotrexate by by-passing the inhibited reductase and is useful in the treatment of methotrexate toxicity.

C	Intestinal bacterial overgrowth is regarded as one of the common causes

Intestinal bacterial overgrowth is not a common cause of folic acid deficiency; this can cause B12 deficiency.

D	Causes abnormal neurological findings indistinguishable from that associated with B12 deficiency

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Causes abnormal neurological findings indistinguishable from that associated with B12 deficiency is incorrect. The lack of neurological

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A 57-year-old bar owner returns from the summer season in Tenerife. He visits the GP because he is having increasing relationship difficulties, and is unable to maintain his erection when attempting sexual intercourse with his partner. He admits to drinking a little too much, around 40 units of alcohol per week, and has a history of arthritis in his knees, for which he takes occasional diclofenac. On examination his BP is 155/92 mmHg, his pulse is 87 bpm and regular. He looks rather tanned, and has signs of chronic liver disease. His secondary sexual hair seems a little sparse.

Investigations:

Hb	131 g/l
WCC	7.1 x 10^9/l
PLT	199 x 10^9/l
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	90 µmol/l
ALT	110 U/l
Bilirubin	54 µmol/l
Fasting glucose	8.4 mmol/l

Which one of the following is the most sensitive screen for the likely underlying diagnosis?

A	Serum copper
B	Serum ferritin
C	Serum iron

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relationship difficulties, and is unable to maintain his erection when attempting sexual intercourse with his partner. He admits to drinking a little too much, around 40 units of alcohol per week, and has a history of arthritis in his knees, for which he takes occasional diclofenac. On examination his BP is 155/92 mmHg, his pulse is 87 bpm and regular. He looks rather tanned, and has signs of chronic liver disease. His secondary sexual hair seems a little sparse.

Investigations:

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Fasting glucose	8.4 mmol/l

Which one of the following is the most sensitive screen for the likely underlying diagnosis?

A	Serum copper
B	Serum ferritin
C	Serum iron
D	Serum testosterone
E	Transferrin saturation

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E Transferrin saturation

This man has all the features of hereditary haemochromatosis. Transferrin saturation is the best way of assessing any possible iron overload. This is best done on a fasting sample, and is calculated using the serum iron and total iron binding capacity. A fasting transferrin saturation of greater than 55% is indicative of iron overload.

A Serum copper

Serum copper is incorrect. Serum copper has nothing to do with haemochromatosis.

B Serum ferritin

Serum ferritin is incorrect. Evidence of iron overload needs to be demonstrated in this man and this is best done as an initial screen using transferrin saturation. Serum ferritin may be falsely raised in this man with signs of chronic liver disease and alcohol excess.

C Serum iron

Serum iron is incorrect. Serum iron is not useful, because it is dependent upon temporary fluctuationsin serum iron levels.

D Serum testosterone

Serum testosterone is incorrect. Serum testosterone has nothing to do with iron metabolism.

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A 60-year-old woman presents complaining of feeling unwell for the last 2 months. She has widespread lymphadenopathy. Her full blood count is as follows:

Hb	9.5 g/dl (11.5–16.5)
WCC	45 × 10^9/l ((4–11) × 10^9)
platelets	80 × 10^9/l ((150–400) × 10^9)

Abnormal lymphocytes are present on the blood film. Bone marrow aspirate shows lymphocyte infiltration, which on immunophenotyping are CD19+, CD5+, CD10–, CD22+ and CD23–. Cytogenetics show a t(11;14) (q13;q32) translocation.

Which one of the following is the most likely diagnosis?

A	Acute lymphoblastic leukaemia
B	Chronic lymphocytic leukaemia
C	Follicular lymphoma
D	Hodgkin's disease
E	Mantle-cell lymphoma

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7:39

E Mantle-cell lymphoma

This lady has anaemia with thrombocytopenia. The white-cell count is significantly raised with abnormal lymphocytes present on the blood film. This therefore suggests some form of chronic lymphoproliferative disorder. There is lymphocytic infiltration in the bone marrow. This is a B-cell lymphoproliferative disorder,as demonstrated by CD19 positivity. The t(11;14) translocation is typical of mantle-cell lymphoma.

This is a very difficult question. The distinction between mantle-cell lymphoma and follicular lymphoma at the MRCP level would be very difficult. It would be fair to say that Hodgkin's disease should be ruled out as an obvious wrong answer, because of the infrequent marrow and peripheral blood involvement. Acute lymphoblastic leukaemia would also be ruled out, given the fact that it rarely causes such widespread lymphadenopathy.

A Acute lymphoblastic leukaemia

Acute lymphoblastic leukaemia is incorrect. Acute lymphoblastic leukaemia is false. It could certainly cause the peripheral blood picture of anaemia, thrombocytopenia and a raised white-cell count. It is not, however, associated with t(11;14) translocation. Acute lymphoblastic leukaemia, as opposed to the chronic lymphoproliferative disorders, also does not usually cause widespread lymphadenopathy.

B Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia (CLL) is incorrect. CLL usually causes a raised white-cell count, but it is unusual to cause significant thrombocytopenia. The lymphocytes that are present in the peripheral blood film are usually of normal size and shape. CLL is not associated with the t(11;14) translocation.

C Fol ymphoma

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count. It is not, however, associated with t(11;14) translocation. Acute lymphoblastic leukaemia, as opposed to the chronic lymphoproliferative disorders, also does not usually cause widespread lymphadenopathy.

B	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia (CLL) is incorrect. CLL usually causes a raised white-cell count, but it is unusual to cause significant thrombocytopenia. The lymphocytes that are present in the peripheral blood film are usually of normal size and shape. CLL is not associated with the t(11;14) translocation.

C	Follicular lymphoma

Follicular lymphoma is incorrect. Follicular lymphoma is a form of low-grade non-Hodgkin's lymphoma. It is often associated with widespread lymphadenopathy and bone marrow involvement. Peripheral blood lymphocytosis,however, is rarer, but certainly can occur. It is not associated with a t(11;14) translocation that is found in mantle-cell lymphoma. Instead, the most common cytogenetic abnormality in follicular lymphoma is t(14;18).

D	Hodgkin's disease

Hodgkin's disease is incorrect. Hodgkin's disease is certainly false. It is very rare to get peripheral blood involvement with Hodgkin's disease, and marrow infiltration is also uncommon. It too is not associated with the t(11;14) translocation.

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A 67-year-old homeless gentleman was brought unconscious to the Emergency Department. There were no signs of trauma externally. He had a strong alcohol breath, generalised bruising and hepatosplenomegaly. The hospital staff knew him as he had been admitted several times in the past year. His blood results showed aHb 125 g/l, MCV 134 fl, WBC 7 × 109/l and platelets of 101 × 109/l. His coagulation profile showed a prothrombin time of 19 s (reference value 11–14 s) activated partial thromboplastin time (APTT) of 41 s (20–40 s) and a thrombin time of 17 s (reference value 10–15 s). His fibrinogen value was > 4 g/l and his D-dimers value was slightly elevated.

Which one of the following may not contribute to his haemorrhagic state?

A	Dysfibrinogenaemia
B	Impaired fibrinolysis
C	Low factor VII levels
D	Low protein C values
E	Thrombocytopaenia

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Explanation

D Low protein C values

Low protein C values will not be contributing to his haemorrhagic state. Protein C acts as a natural anticoagulant; low levels are associated with venous thrombotic events, not bleeding.

B Impaired fibrinolysis

Impaired fibrinolysis is incorrect. Impaired fibrinolysis can contribute to his haemorrhagic state due to abnormal production of inhibitors of plasmin and plasminogen.

A Dysfibrinogenaemia

Dysfibrinogenaemia is incorrect. Dysfibrinogenaemia can occur in liver disease. This is present in this case, as demonstrated by a prolonged thrombin time in the presence of normal fibrinogen levels.

C Low factor VII levels

Low factor VII levels is incorrect. Low factor VII levels may contribute to his haemorrhagic state.

E Thrombocytopaenia

Thrombocytopaenia is incorrect. Thrombocytopaenia as a result of a direct myelosuppressive effect on the bone marrow, as well as hypersplenism, will also contribute to his haemorrhagic state.

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A 42-year-old gentleman with pyrexia of unknown origin is being investigated. He received a renal transplant 3.5 years previously, where the donor was CMV antibody positive, EBV antibody positive, HIV negative. On examination he has enlarged axillary lymph nodes. His bloods are as follows:

Hb	10.0 g/dl
WCC	9.2 x 10^9/l
PLT	135 x 10^9/l
Creatinine	120 µmol/l (3 years ago was 110)
ESR	50 mm/h

Which one of the following is the likely cause?

A	CMV
B	EBV
C	Hepatitis C
D	HIV
E	Lymphoma

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Explanation

E	Lymphoma

Lymphoma is the second most frequent malignancy apart from skin malignancy seen in patients post transplant. The mean time of presentation is 34 months post transplant. The lymphadenopathy, anaemia and raised ESR seen here fit well with the lymphoma diagnosis. The risk of cervical, breast and colorectal cancer is also increased.

There is some evidence that post-transplant lymphoma is increased in patients with a history of previous EBV infection and may be related to viral reactivation.

A	CMV

CMV is incorrect. CMV reactivation is unlikely to present at such a late stage following transplant. CMV is the most important viral infection that occurs post transplant and usually presents a few months after the graft, and presents with clinical infective symptoms (e.g. fevers, pneumonia) or graft failure/rejection.

B	EBV

EBV is incorrect. EBV reactivation is unlikely to present at such a late stage following transplant. EBV typically presents within a year of transplant.

C	Hepatitis C

Hepatitis C is incorrect. There is nothing to suggest the patient is at risk of hepatitis C and this would be unlikely to cause axillary lymphadenopathy.

D	HIV

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diagnosis. The risk of cervical, breast and colorectal cancer is also increased.

There is some evidence that post-transplant lymphoma is increased in patients with a history of previous EBV infection and may be related to viral reactivation.

A	CMV

CMV is incorrect. CMV reactivation is unlikely to present at such a late stage following transplant. CMV is the most important viral infection that occurs post transplant and usually presents a few months after the graft, and presents with clinical infective symptoms (e.g. fevers, pneumonia) or graft failure/rejection.

B	EBV

EBV is incorrect. EBV reactivation is unlikely to present at such a late stage following transplant. EBV typically presents within a year of transplant.

C	Hepatitis C

Hepatitis C is incorrect. There is nothing to suggest the patient is at risk of hepatitis C and this would be unlikely to cause axillary lymphadenopathy.

D	HIV

HIV is incorrect. There is nothing to suggest the patient is at risk of HIV.

Learning objective: Patients who have received renal transplants are at increased risk of malignancy, particularly skin cancers and lymphoma, due to prolonged immunosuppression.

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You are working in the haematology lab reviewing blood films when one taken on an 18-year-old man presenting to his GP with tiredness and easy bruising is presented for review. Some of his results are shown below:

Hb	8.2 g/dl (increased reticulocytes, fragmented red cells seen)
WCC	22.1 x 10^9/l (blast cells containing Auer rods seen)
PLT	54 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	112 micromol/l

Which of the following is the next most important blood test?

A	Clotting screen
B	Cytochemical staining
C	Cytogenetic studies
D	LDH level
E	Urate

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7:45
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A	Clotting screen

Clotting screen is the next most important blood test. This 18-year-old man has evidence of blast cells on the peripheral blood film, many of which contain Auer rods. He is also anaemic and thrombocytopaenic. He therefore has acute myeloid leukaemia. All patients with acute myeloid leukaemia need an urgent clotting screen to make sure there is no evidence of DIC that might suggest acute promyelocytic leukaemia.

C	Cytogenetic studies

Cytogenetic studies is incorrect. Cytogenetic studies will be critically important in establishing the prognosis of all patients with acute myeloid leukaemia. However, the most important initial blood test is a coagulation screen to rule out DIC.

B	Cytochemical staining

Cytochemical staining is incorrect. Cytochemical staining is rarely done nowadays, and has usually been superseded by immunophenotyping, to establish the myeloid nature of this condition.

D	LDH level

LDH level is incorrect. LDH level is often elevated in haematological malignancies, owing to increased cell turnover, but is a very non-specific finding.

E	Urate

Urate is incorrect. Serum urate is often elevated in haematological malignancies, owing to increased cell turnover, but is a very non-specific finding.

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Where is the chromosomal translocation in acute promyelocyticleukaemia located?

A	t(9:22)
B	t(10:19)
C	t(13:18)
D	t(15:17)
E	t(16:18)

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Previous Question | Skip Question

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E t(16:18)

Explanation

D t(15:17)

t(15:17) is the characteristic translocation found in acute promyelocytic leukaemia (APML). This results in the fusion protein PML-RARA between the RARA protein, and a transcription factor called PML.

A t(9:22)

t(9:22) is incorrect. t(9:22) is the Philadelphia translocation. It is found in cases of CML, and some cases of acute lymphoblastic leukaemia.

B t(10:19)

t(10:19) is incorrect. This is false. The characteristic translocation found in APML is t(15:17).

C t(13:18)

t(13:18) is incorrect. This is false. The characteristic translocation found in APML is t(15:17).

E t(16:18)

t(16:18) is incorrect. This is false. The characteristic translocation found in APML is t(15:17).

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A 62-year-old woman presents to the Emergency Department with progressively worsening headache, drowsiness and confusion. She has apparently suffered abdominal pain and diarrhoea over the past few days after visiting a local petting farm with her grandaughter. On examination her BP is 165/95 mmHg, pulse is 85/min and regular. You notice a purpuric rash and her abdomen is generally tender on palpation. She has a GCS of 13, and a 4/5 power weakness affecting her right arm. Investigations:

Hb	97 g/l (fragmented red cells seen on film)
WCC	11.1 x 10^9/l
PLT	44 x 10^9/l
Na^+	138 mmol/l
K^+	5.3 mmol/l
Creatinine	210 micromol/l

Which of the following is the most likely diagnosis?

A	Acute lupus nephritis
B	Idiopathic thrombocytopaenic purpura (ITP)
C	Meningococcal septicaemia
D	Thrombotic thrombocytopaenic purpura (TTP)
E	Typhoid fever

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Explanation

D	Thrombotic thrombocytopaenic purpura (TTP)

Thrombotic thrombocytopaenic purpura (TTP) is the most likely diagnosis. She has anaemia associated with thrombocytopaenia and fragmented red blood cells on the blood film. This, by definition, is microangiopathic haemolytic anaemia, and she has evidence of acute renal impairment. She also has neurological signs. All of this would be entirely compatible with TTP, and would require urgent plasma exchange.

A	Acute lupus nephritis

Acute lupus nephritis is incorrect. By definition, this lady has microangiopathic haemolytic anaemia. This is defined as anaemia associated with thrombocytopaenia and fragmented red blood cells until proved otherwise. Acute nephritis would obviously give acute renal impairment, but would not give rise to microangiopathic haemolytic anaemia.

B	Idiopathic thrombocytopaenic purpura (ITP)

Idiopathic thrombocytopaenic purpura (ITP) is incorrect. ITP would not give fragmented red blood cells, anaemia or acute renal failure. It would not be associated with neurological signs unless there was an accompanying intracerebral bleed, which would be very rare with a platelet count of 44.

C	Meningococcal septicaemia

Meningococcal septicaemia is incorrect. Meningococcal septicaemia would not explain the microangiopathic haemolytic anaemia. She has no evidence of cardiovascular compromise such as hypotension or tachycardia. This would be expected in meningococcal sepsis.

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7:48

A 74-year-old man presented with a 3-month history of lethargy. One month prior to referral the patient had been treated by his general practitioner for an acute attack of gout. Examination demonstrated gross splenomegaly, but there were no other findings. The full blood count was haemoglobin 9.7 g/dl, white blood cell count 125.4 × 10^9 per litre (differential: neutrophils 40%, metamyelocytes 12%, myelocytes 22%, promyelocytes 6%, blast cells 8%, basophils 4%, eosinophils 3%, nucleated red cells 5%), platelets 720 × 10^9 per litre.

Which one of the following is the most likely diagnosis?

A	Chronic myeloid leukaemia
B	Disseminated carcinoma of the prostate
C	Non-Hodgkin's lymphoma
D	Pernicious anaemia
E	Sickle cell anaemia

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7:48

A	Chronic myeloid leukaemia

Chronic myeloid leukaemia is the correct answer. We are told that this man has gross splenomegaly. There are only two main reasons why patients have significant gross splenomegaly. These are chronic myeloid leukaemia and myelofibrosis. In chronic myeloid leukaemia the white cell count is significantly raised as is the case here, but in myelofibrosis there is often a pancytopenia. Note in this question the platelet count is raised also, which is consistent with the myeloproliferative nature of chronic myeloid leukaemia. The white blood cell differential is also typical of chronic myeloid leukaemia, with the predominance of neutrophils and myelocytes over other forms of granulocytic precursors. Note that he has had an acute attack of gout. This is because of the auto-destruction of the very high white cell count, which will result in significant DNA breakdown and hence gout.

B	Disseminated carcinoma of the prostate

Disseminated carcinoma of the prostate is incorrect. This would not explain such a very, very raised white cell count, and would also not give gross splenomegaly.

C	Non-Hodgkin's lymphoma

Non-Hodgkin's lymphoma is incorrect. This is a myeloproliferative disorder, with a very significantly raised white cell count; the cells are mainly neutrophils and other granulocytic precursors. There is nothing in the question to suggest symptoms of non-Hodgkin's lymphoma like significant weight loss or widespread lymphadenopathy.

D	Pernicious anaemia

Pernicious anaemia is incorrect. Again this would not account for the clinica gs and the laboratory results that have been presented

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A 21-year-old woman comes to the Haematology Clinic for review. She describes tiredness and lethargy that have increased over the past few months, and she is worried that something serious may be wrong. There is no past medical history of note, although her brother has G6PD deficiency. She looks pale, her BP is 110/70 mmHg with no postural drop. She is thin with a BMI of 19 but there are no significant abnormal findings. Investigations:

Hb	9.1 g/dl
MCV	76 fl
Blood film	Howell-Jolly bodies seen
WCC	4.5 x 10^9/l
PLT	201 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	110 micromol/l
Ferritin	8 microg/l

Which of the following is the most useful next investigation?

A	Anti-TTG antibody
B	G6PD enzyme activity
C	Haemoglobin electrophoresis
D	Haptoglobins
E	Lead levels

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Audio
Video
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Explanation

A	Anti-TTG antibody

Anti-TTG antibody is the next most useful investigation. She has a serum ferritin of 8 and therefore has iron deficiency. Howell-Jolly bodies suggest hyposplenism. This combination of iron deficiency and hyposplenism suggests coeliac disease. Therefore, a coeliac screen using anti-TTG antibody would be appropriate.

B	G6PD enzyme activity

G6PD enzyme activity is incorrect. We are told that her brother has G6PD deficiency.G6PD deficiency usually causes episodic haemolysis, often as a result of infections or drugs.This clinically is not the case in this question. Furthermore, we have a definite diagnosis of iron deficiency here. There is no blood film evidence such as polychromasia or bite cells, which might suggest haemolysis in this situation.

C	Haemoglobin electrophoresis

Haemoglobin electrophoresis is incorrect. We have an established diagnosis of iron deficiency. There is no suggestion that this woman has a haemoglobinopathy, and oftenhaemoglobinopathies result in elevated iron stores, not iron deficiency.

D	Haptoglobins

Haptoglobins is incorrect. Haptoglobins are reduced in intravascular haemolysis and there is no suggestion of this at the moment.

E	Lead levels

Lead levels is incorrect. Lead leads to basophilic stippling of the red blood cells is not seen on the blood film. Clinically, this is a very dition nowadays, and we already have a

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A 40-year-old man presents with symptoms and signs of anaemia. He has also recently had recurrent infections that have taken longer than usual to resolve, and he has frequent nose bleeds. There is no organomegaly. Some 15 years ago he had chemotherapy and radiotherapy for Hodgkin's disease.

Which haematological condition would you be particularly concerned about?

A	A new primary lymphoma
B	A secondary acute myeloid leukaemia
C	Multiple myeloma
D	Myelofibrosis
E	Relapse of Hodgkin's disease

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B	A secondary acute myeloid leukaemia

Secondary acute myeloid leukaemia is a late complication of chemotherapy and radiotherapy given for this man's Hodgkin's disease some 15 years ago. Secondary AML has a poorer prognosis than de novo AML and is often refractory to treatment. His symptoms suggest a combination of anaemia and thrombocytopenia, which would be found in acute myeloid leukaemia.

D	Myelofibrosis

Myelofibrosis is incorrect. There is nothing to suggest myelofibrosis here, and we are told that there is no organomegaly, such as an enlarged spleen.

A	A new primary lymphoma

A new primary lymphoma is incorrect. A new primary lymphoma is possible, but advanced marrow failure would be an unusual presentation.

C	Multiple myeloma

Multiple myeloma is incorrect. There is nothing to suggest the development of multiple myeloma here, and despite there being a plasma cell infiltration in myeloma, this is usually not sufficient to cause very dramatic pancytopenia.

E	Relapse of Hodgkin's disease

Relapse of Hodgkin's disease is incorrect. Relapse of Hodgkin's disease is unusual, particularly after such a long time frame. Malignant infiltration of the marrow is very unusual in Hodgkin's disease.

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A 29-year-old woman was diagnosed with Hodgkin's disease 10 years ago. She is in hospital having received combination chemotherapy for a third relapse. Now, she is pancytopenic and has required considerable blood-product support. Over the last 3 days she has developed a persisting fever, an extensive maculopapular rash, diarrhoea and deterioration in liver function tests. Her blood count is now:

Hb 10.2 g/dl; WCC 0.2 × 10^9/l and platelets 9 × 10^9/l

AST 122 IU/l

ALT 200 IU/l

γ-GT 99 IU/l.

Which one of the following is the most likely cause of her current symptomatology?

A	Allergy to allopurinol
B	Chickenpox
C	Cytomegalovirus infection
D	Disseminated Hodgkin's disease
E	Transfusion-associated graft-versus-host disease

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Explanation

E Transfusion-associated graft-versus-host disease

Hodgkin's is a risk factor for transfusion associated graft versus host disease and this patient has typical features of this condition, with persisting fever, rash, diarrhoea and abnormal liver function tests. Unfortunately this disease results in death in over 90% of cases and all at-risk patients, such as patients with Hodgkin's disease, should receive irradiated blood products.

C Cytomegalovirus infection

Cytomegalovirus infection is incorrect. This can cause a colitis, which may result in diarrhoea as well as causing abnormal liver function tests. This usually only occurs, however, in the post-allogeneic transplant setting.

A Allergy to allopurinol

Allergy to allopurinol is incorrect. This is a common cause of rash in patients who are receiving chemotherapy, but of course it would not explain the abnormal liver function tests, diarrhoea or fever.

B Chickenpox

Chickenpox is incorrect. This can obviously cause a wide array of clinical features, but it is rare to see this following chemotherapy. Transfusion associated graft versus host disease would be a more appropriate answer.

D Disseminated Hodgkin's disease

Disseminated Hodgkin's disease is incorrect. This would present with pe ever, lymphadenopathy and potentially pancytopenia if there ne marrow involvement, but it wouldnot explain the abnormal liver function tests or rash.

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A 23-year-old woman presents to the Emergency Department with oral bleeding. She has noticed it more frequently over the past two weeks and has become breathless when walking up stairs. She has a history of epilepsy and takes phenytoin and a combined oral contraceptive pill. On examination, she is afebrile with swollen gums and has conjunctival pallor. There is no palpable lymphadenopathy and no abdominal organomegaly. Investigations:

Hb	6.4 g/dl
MCV	82 fl
RDW	28%
PLT	19 x 10^9/l
WCC	11 x 10^9/l
PT	39 s
APTT	98 s
Albumin	34 g/dl

Results also show low fibrinogen and increasing fibrin-degradation products (FDPs).

What is the unifying diagnosis?

A	Phenytoin toxicity
B	Acute lymphocytic leukaemia
C	Disseminated intravascular coagulation

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weeks and has become breathless when walking up stairs. She has a history of epilepsy and takes phenytoin and a combined oral contraceptive pill. On examination, she is afebrile with swollen gums and has conjunctival pallor. There is no palpable lymphadenopathy and no abdominal organomegaly. Investigations:

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Results also show low fibrinogen and increasing fibrin-degradation products (FDPs).

What is the unifying diagnosis?

A	Phenytoin toxicity
B	Acute lymphocytic leukaemia
C	Disseminated intravascular coagulation
D	Acute promyelocytic leukaemia
E	Acute myelomonocytic leukaemia

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Explanation

D	Acute promyelocytic leukaemia

This would explain the significant anaemia and thrombocytopenia and is a common haematological reason for disseminated intravascular coagulation problems.

Before you can decide what the unifying diagnosis is, you need to understand the background to this question. This lady is significantly anaemic and thrombocytopenic. She has a raised PT, raised APTT with low fibrinogen and increased FDPs. D-dimer is an FDP. This therefore means that this young lady has anaemia, thrombocytopenia and evidence of disseminated intravascular coagulation. Therefore, the unifying diagnosis has to incorporate all of these factors.

E	Acute myelomonocytic leukaemia

Acute myelomonocytic leukaemia is incorrect. Occasionally this can lead to DIC, but the link between acute promyelocytic leukaemia and DIC is much more common.

A	Phenytoin toxicity

Phenytoin toxicity is incorrect. This will not cause DIC, thrombocytopenia or a severe anaemia.

B	Acute lymphocytic leukaemia

Acute lymphoblastic leukaemia is incorrect. Acute lymphoblastic leukaemia could cause the anaemia and thrombocytopenia but does not usually cause DIC.

C	Disseminated intravascular coagulation

Disseminated intravascular coagulation (DIC) is incorrect. DIC itself

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B	Acute lymphocytic leukaemia

Acute lymphoblastic leukaemia is incorrect. Acute lymphoblastic leukaemia could cause the anaemia and thrombocytopenia but does not usually cause DIC.

C	Disseminated intravascular coagulation

Disseminated intravascular coagulation (DIC) is incorrect. DIC itself is usually secondary to an underlying diagnosis, and that is why the word 'unifying' is present. Therefore, unless there is a better answer that may explain the whole situation, this is not the correct answer as it is not pointing towards an underlying cause for the DIC.

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A 17-year-old girl undergoes a thrombophilia screen 1 week after discontinuing anticoagulants for a previous PE sustained while on the pill. The results are as follows: protein C 40% (50–150), protein S 36% (50–150), antithrombin III 199 (50–150), APC resistance 1.4 (3–4).

What further action will you take?

A	DNA analysis for Factor V Leiden
B	Family study
C	Reintroduce anticoagulants
D	Repeat thrombophilia screen 3 weeks later
E	Screen for the prothrombin polymorphism

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Explanation

D	Repeat thrombophilia screen 3 weeks later

This 16-year-old girl has only been off warfarin for a week before the thrombophilia screen was taken. Protein Cand protein S levels are low. However, protein C and protein S are vitamin K dependent, and therefore to obtain a meaningful result, the results should be repeated after a substantial amount of time when the patient is off warfarin.

A	DNA analysis for Factor V Leiden

DNA analysis for Factor V Leiden is incorrect. The whole area of thrombophilia screening is very controversial. One could argue that a thrombophilia screen is not really indicated in this situation at all. Current guidance suggests that results of a thrombophilia screen do not help in determining intensity or duration of anticoagulation.

B	Family study

Family study is incorrect. Family study is not required in the situation described and repeating the probably falsely low protein C and protein S levels would be the first management step.

C	Reintroduce anticoagulants

Reintroduce anticoagulants is incorrect. Reintroducing anticoagulants is a difficult issue. Recent publications do suggest that calculating a DASH score may help in this decision-making process, but patients who sustain a venous thrombotic event while on the oral contraceptive pill have a lower risk of recurrence if this medication is stopped. The decision to reintroduce anticoagulation needs to be made on a case-by-case basis.This will be determined by ongoing risk factors for further venous thrombotic events, balanced against any other risk factors for bleeding.The patient wishes and lifestyle factors will also need to be taken into consideration.

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E	Screen for the prothrombin polymorphism

Screen for the prothrombin polymorphism is incorrect. This is a common mutation, which is present in about 2% of the UK population. Even if it was found, this would not usually influence the decision whether or not to reintroduce anticoagulants at this point in time.

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A 28-year-old patient presents with right upper abdominal pain, hepatomegaly and ascites.

Which one of the following is the most likely underlying condition?

A	Haemophilia A
B	Haemophilia B
C	Hereditary spherocytosis
D	Thrombotic thrombocytopaenic purpura
E	von Willebrand's disease

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D Thrombotic thrombocytopaenic purpura

Patients with thrombotic thrombocytopaenic purpura have a high risk of developing thrombosis. The Budd-Chiari syndrome is a condition caused by occlusion of the hepatic veins that drain the liver, and it presents with a classic triad of abdominal pain, ascites and liver enlargement.

C Hereditary spherocytosis

Hereditary spherocytosis is incorrect. This may result in gallstones due to chronic haemolysis but would not result in hepatomegaly or ascites.

A Haemophilia A

Haemophilia A is incorrect. This would result in bleeding, not thrombosis.

B Haemophilia B

Haemophilia B is incorrect. This would result in bleeding, not thrombosis.

E von Willebrand's disease

von Willebrand's disease is incorrect. This would not cause the symptoms described in the scenario.

45464

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You are reviewing the samples collected and results of investigations from a 66-year-old man who was reviewed in the Haematology Clinic to decide on his underlying diagnosis.

His results are below:

Hb	92 g/l
Leukoerythroblastic blood picture with tear-drop poikilocytosis	
WCC	4.9 x 10^9/l
PLT	602 x 10^9/l
Na^+	139 mmol/l
K^+	5.4 mmol/l
Creatinine	130 µmol/l
Bone scan	Patchy increases in bone density
Bone marrow aspirate	Dry tap
Bone marrow biopsy	Patchy reticular fibrosis, with small areas of haemopoietic cells

Which one of the following is the most common feature of this disease which leads to presentation to medical services?

A	Bruising
B	Fatigue
C	GI haemorrhage

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Which one of the following is the most common feature of this disease which leads to presentation to medical services?

A	Bruising
B	Fatigue
C	GI haemorrhage
D	Infections

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B	Fatigue

This man has evidence of myelofibrosis on a blood film, and this is confirmed on the bone marrow biopsy. Fatigue can be very debilitating in myelofibrosis, and these patients are often very catabolic. Splenomegaly can often cause problems with food intake, due to compression on the stomach. In addition, anaemia will also contribute to the fatigue.

A	Bruising

Bruising is incorrect. The platelet count is high. Bruising can actually occur in myelofibrosis, butfatigue is much more of a debilitating symptom.

C	GI haemorrhage

GI haemorrhage is incorrect. GI haemorrhage can occur in myelofibrosis due to portal hypertension. However, fatigue is much more common.

D	Infections

Infections is incorrect. Infections can occur, but fatigue is a much more likely presenting feature.

E	Toe pain

Toe pain is incorrect. Toe pain might suggest a microvascular thrombosis, but once again, fatigue would be a more common presenting feature.

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A 57-year-old man presents with weight loss and a neck swelling. He is subsequently confirmed to have a thyroid malignancy.

Which one of the following statements regarding this condition is correct?

A	80–90% are medullary carcinomas
B	Iodine-131 therapy is an alternative to total thyroidectomy
C	Papillary cell carcinoma of the thyroid produces high calcitonin levels
D	Serum thyroglobulin measurement is the main method of early detection of recurrent papillary and follicular thyroid cancers
E	Subtotal lobectomy is the minimum treatment of choice

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Previous Question | Skip Question

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Explanation

D	Serum thyroglobulin measurement is the main method of early detection of recurrent papillary and follicular thyroid cancers

Thyroglobulin, a glycoprotein, is produced by normal and neoplastic follicular cells. Serum thyroglobulin measurements are the main modality for the early detection of recurrent differentiated (papillary/follicular) thyroid cancer.

A	80–90% are medullary carcinomas

80–90% are medullary carcinomas is incorrect. Papillary (80–85%) and follicular (5–10%) carcinomas account for 80–90% of thyroid cancers. Medullary and anaplastic thyroid tumours are rarer.

B	Iodine-131 therapy is an alternative to total thyroidectomy

Iodine-131 therapy is an alternative to total thyroidectomy is incorrect. Iodine-131 destroys the residual normal thyroid tissue following resection. To maximise therapy, a total or near-total thyroidectomy should be performed in all patients who are to be treated with iodine.

C	Papillary cell carcinoma of the thyroid produces high calcitonin levels

Papillary cell carcinoma of the thyroid produces high calcitonin levels is incorrect. Calcitonin is produced by C cells in medullary carcinoma.

E	Subtotal lobectomy is the minimum treatment of choice

Subtotal lobectomy is the minimum treatment of choice is incorrect. Total lobectomy is the minimum treatment for thyroid cancer.

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A 25-year-old woman comes to the pregnancy clinic for review. This is her second pregnancy. She suffered a post-partum haemorrhage after the birth of her first child but is otherwise well and has an uncomplicated past medical history. She is 14 weeks' pregnant, and has had a normal pregnancy so far. Physical examination is unremarkable. Investigations:

Hb	11.9 g/dl
WCC	8.1 $x10^9$/l
PLT	201 $x10^9$/l
Na^+	137 mmol/l
K^+	4.5 mmol/l
Creatinine	85 micromol/l
PT	12.2 s
APTT	51.2s (normalises on 50:50 mixing with donor plasma)
D-dimer	85
Factor VIII activity level	12%
Bleeding time	normal

Which of the following is the most likely diagnosis?

A	Acquired haemophilia
B	Anti-phospholipid antibody syndrome

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and has an uncomplicated past medical history. She is 14 weeks' pregnant, and has had a normal pregnancy so far. Physical examination is unremarkable. Investigations:

Hb	11.9 g/dl
WCC	8.1 x10^9/l
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D-dimer	85
Factor VIII activity level	12%
Bleeding time	normal

Which of the following is the most likely diagnosis?

A	Acquired haemophilia
B	Anti-phospholipid antibody syndrome
C	Haemophilia A carrier
D	Haemophilia B carrier
E	von Willebrand's disease

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8:08

C Haemophilia A carrier

We are told that this lady has a low factor VIII level. This therefore is either von Willebrand's disease or haemophilia A carrier. The bleeding time is normal, which is against a diagnosis of Von Willebrand's disease. She is therefore likely to be a haemophilia A carrier.

E von Willebrand's disease

Von Willebrand's disease is incorrect. von Willebrand's disease results in an abnormal bleeding time, which is not the case in this question.

A Acquired haemophilia

Acquired haemophilia is incorrect. Acquired haemophilia would be a possibility with low factor VIII level. However, the APTT returns to normal when it is mixed in a 50:50 ratio with normal plasma. This suggests that the mixing adds in a missing coagulation factor such as factor VIII. If there were an inhibitor, which would be found in acquired haemophilia, the APTT would not normalise when mixed with normal plasma, because the inhibitor would continue to work and inhibit any factor VIII within the normal plasma.

B Anti-phospholipid antibody syndrome

Anti-phospholipid antibody syndrome is incorrect. Anti-phospholipid antibody syndrome is associated with thrombosis rather than bleeding and would not result in a low factor VIII level.

D Haemophilia B carrier

Haemophilia B carrier is incorrect. Haemophilia B carrier would result in a low factor IX level rather than a low factor VIII level.

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A 30-year-old woman is admitted with a right-sided hemiparesis. She returned 2 days earlier from visiting her sister in Australia. She has been generally well apart from occasional migraine headaches. The only medication of note is the progesterone-only contraceptive pill. On examination her BP is elevated at 152/89 mmHg and she has a right-sided hemiparesis. You note that her right leg is swollen. Her flat mate tells you that she complained that the leg was aching just after she returned home.

Investigations:

Hb	124 g/l
WCC	6.1 x 10^9/l
PLT	210 x 10^9/l
Na+	140 mmol/l
K+	4.9 mmol/l
Creatinine	109 µmol/l
ESR	10 mm/h

Which one of the following investigations would be most helpful in revealing the cause of her stroke?

A	Abdominal ultrasound scan
B	Carotid duplex
C	CT head
D	Echocardiography
E	Right leg venogram

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Explanation

D	Echocardiography

It would appear that this lady has suffered a right leg deep vein thrombosis (DVT), but also has a right-sided hemiparesis. This would lead to the possibility of a paradoxical embolus through a patent foramen ovale, causing her stroke. This may well be identified by echocardiography.

A	Abdominal ultrasound scan

Abdominal ultrasound scan is incorrect. Abdominal ultrasound scan will not help in elucidating the cause of her stroke.

B	Carotid duplex

Carotid duplex is incorrect. Carotid duplex would not tie in with her possible right DVT.

C	CT head

CT head is incorrect. CT head will determine whether or not she has had a thrombotic orhaemorrhagic stroke, but will not be helpful in revealing the cause of her stroke.

E	Right leg venogram

Right leg venogram is incorrect. Right leg venogram would nowadays be superseded by ultrasonography. Although this might confirm a coincidental DVT, demonstration of a patent foramen ovale will be most helpful in revealing the cause of her stroke.

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A 49-year-old man returns from working abroad with a recent diagnosis of chronic myeloid leukaemia. You are considering a trial of the drug imatinib.

Which one of the following statements best fits the advice and information to be given regarding the use of imatinib?

A	Constipation is a common side-effect
B	Gynaecomastia never occurs in patients taking imatinib
C	It is recommended by NICE for Philadelphia chromosome-negative patients
D	Nausea is common in patients taking imatinib
E	NICE recommends not initiating therapy in the accelerated phase

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Previous Question | Skip Question

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Normal Values

Annotation
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Audio
Video
Share
Participants
More

D	Nausea is common in patients taking imatinib

Nausea is common in patients with imatinib, but is usually easily managed.

E	NICE recommends not initiating therapy in the accelerated phase

NICE recommends not initiating therapy in the accelerated phase is incorrect. The NICE recommendations are that it can be used in the accelerated phase of the disease.

A	Constipation is a common side-effect

Constipation is a common side effect is incorrect. Diarrhoea is more common.

B	Gynaecomastia never occurs in patients taking imatinib

Gynaecomastia never occurs in patients taking imatinib is incorrect. Gynaecomastia has been reported in patients taking imatinib.

C	It is recommended by NICE for Philadelphia chromosome-negative patients

It is recommended by NICE for Philadelphia chromosome-negative patients is incorrect. Imatinib targets the abnormal tyrosine kinase, and in fact one cannot have chronic myeloid leukaemia without the presence of the Philadelphia chromosome.

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A patient with antiphospholipid syndrome had two deep venous thromboses in the past.

Which one of the following is the most appropriate anticoagulation regimen?

A	Aspirin
B	Aspirin and warfarin
C	Long-term heparin
D	Warfarin for 6 months
E	Warfarin lifelong

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E	Warfarin lifelong

Lifelong warfarin is the most appropriate anticoagulation for this man. He has the antiphospholipid antibody syndrome and has had two venous thrombotic events. Regardless of this man's underlying condition, having two deep vein thromboses would require lifelong anticoagulation.

A	Aspirin

Aspirin is incorrect. This is insufficient anticoagulation. Aspirin is particularly useful for the prevention of arterial thrombosis associated with atherosclerosis, but not particularly effectivein the prevention of venous thrombotic events.

B	Aspirin and warfarin

Aspirin and warfarin is incorrect. This combination will result in higher rates of gastrointestinal bleeding.

C	Long-term heparin

Long-term heparin is incorrect. Long-term heparin is costly and uncomfortable, and lifelong warfarin is preferred.

D	Warfarin for 6 months

Warfarin for 6 months is incorrect. Warfarin for 6 months is insufficient. This man has had two venous thrombotic events, that would require lifelong anticoagulation.

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An 81-year-old man with a history of chronic lymphocytic leukaemia (CLL) has a haemoglobin of 55 g/l and is significantly short of breath with severe lethargy. Medication includes prednisolone and fludarabine. You arrange a blood transfusion.

What is the most important requirement for the transfusion?

A	That it is CMV negative
B	That it is EBV negative
C	That it is HLA typed
D	That it is irradiated
E	That it is leukodepleted

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Calculator

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D	That it is irradiated

Patients with CLL who are treated with purine analogues are T-cell depleted and are therefore at risk of transfusion-associated graft-versus-host disease. This is because lymphocytes in the transfusion can cause this condition. Irradiation destroys these donor lymphocytes, reducing the risk of transfusion-associated graft-versus-host disease. Patients who receive purine analogues need life-long irradiated blood products.

A	That it is CMV negative

That it is CMV negative is incorrect. CMV negative blood products are now rarely used. The main use is in pregnant patients who are CMV negative.

B	That it is EBV negative

That it is EBV negative is incorrect. EBV negative blood products are never used.

C	That it is HLA typed

That it is HLA typed is incorrect. There is no role for HLA matched blood products here. In fact, there are no HLA antigens onthe surface of red blood cells, and one cannot request HLA matched red cells.

E	That it is leukodepleted

That it is leukodepleted is incorrect. All blood has been leucodepleted in the UK for many years, to reduce the risk of variant CJD.

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A 27-year-old female is to receive 3 units of blood over 30 min to treat substantial blood loss after delivery. Shortly after the first unit commences she develops urticaria, shortness of breath and back pain. On examination her pulse is 160 bpm.

Which one of the following is the most likely cause?

A	ABO incompatibility
B	Anti-human leukocyte antigen antibodies
C	Anti-neutrophil antibodies
D	Contamination
E	Rhesus incompatibility

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A	ABO incompatibility

ABO incompatibility is the most likely cause of the patient's current condition. The fact that this young lady has a significant tachycardia and back pain is entirely typical of an acute haemolytic transfusion reaction. ABO incompatibility has to be assumed until proved otherwise, with the transfusion being stopped immediately. The blood transfusion should be returned to the laboratory for further serological investigations, and the patient should be supported medically. Treatment may include the involvement of critical care, the renal team and potentially haemodialysis.

B	Anti-human leukocyte antigen antibodies

Anti-human leukocyte antigen (HLA) antibodies is incorrect. Once again, ABO incompatibility must be excluded as a matter of urgency given the clinical scenario.

C	Anti-neutrophil antibodies

Anti-neutrophil antibodies is incorrect. Anti-neutrophil antibodies cause febrile non-haemolytic transfusion reactions, which are usually characterised by fever and itching alone. This is not the case in this question.

D	Contamination

Contamination is incorrect. Contamination for example by bacteria, is false. The most urgent diagnosis to make is that of an ABO incompatible blood transfusion. It should be noted that platelet transfusions carry a higher risk of bacterial contamination than red blood cells. Platelets only have a limited life span of 5 days and need to be stored at room temperature, which promotes bacterial growth. This is compared to units of red blood cells which are stored at lower temperatures in a fridge, thereby limiting bacterial growth.

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A 20-year-old woman presented to the Antenatal Clinic for her booking visit. She speaks very little English, comes from the South Mediterranean, and is 20 weeks' pregnant into her first pregnancy. No medical history of note can be obtained.

Investigations:

Hb	10.1 g/dl
Hct	0.38
RBC	5.24 x 10^{12}/l
MCV	63 fl
MCH	20 pg
MCHC	32 g/dl
WCC	6.9 x 10^{9}/l
PLT	241 x 10^{9}/l

Further testing reveals an Hb F of 0.6% (normal range < 1%) and Hb A_2 of 4.5% (normal range 1.5–3.5%).

Which one of the following is the most likely cause of her anaemia?

A	Acute folic acid deficiency
B	β-Thalassaemia trait
C	Sickle-cell anaemia
D	α-Thalassaemia trait
E	Iron deficiency

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Explanation

B	β-Thalassaemia trait

This lady is of non-White origin. She has a microcytic anaemia, with very significant microcytosis. The haemoglobin A2 level is raised, which is diagnostic of β-thalassaemia trait.

A	Acute folic acid deficiency

Acute folic acid deficiency is incorrect. This would cause a macrocytic, not a microcytic anaemia.

C	Sickle-cell anaemia

Sickle cell anaemia is incorrect. This would not cause such a significant microcytic anaemia.

D	α-Thalassaemia trait

Alpha-thalassaemia trait is incorrect. This can cause a significant microcytic anaemia, but would not be associated with a raised haemoglobin A2 level.

E	Iron deficiency

Iron deficiency is incorrect. This would not result in a raised haemoglobin A2 level. The fact that the question states that the patient speaks very little English suggests that she is not from the United Kingdom and hence the fact that she may well have a haemoglobinopathy, such as β-thalassaemia trait.

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A 55-year-old man presents to his GP with an enlarging skin lesion affecting his lower lip. He first noticed it approximately 6 months ago and he complains of occasional bleeding and itching from the lesion. A dermatology referral is made and, after excision biopsy, a squamous-cell carcinoma of his lower lip is diagnosed.

Which one of the following is most likely to be a feature of this type of carcinoma?

A	It commonly spreads to distant sites by venous channels
B	It is capable of metastasising via the lymphatics
C	It is commonly seen in patients under 45 years of age
D	It most commonly arises on the torso
E	Survival is measured in weeks to months

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Previous Question | Skip Question

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Video
Share
Participants
More

8:17
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B	It is capable of metastasising via the lymphatics

Squamous-cell carcinoma of the skin is the second most common skin cancer in the UK and is related to sun exposure. A squamous-cell carcinoma usually appears as a scaly or crusty area of skin, with a red, inflamed base. Most small squamous-cell carcinomas are not painful. Squamous-cell carcinoma of the skin is seldom seen in persons under 45 years of age. It is related to UV exposure and usually occurs in sun-exposed areas such as the face and lower lips.

Squamous-cell carcinomas may arise from areas of Bowen's disease and sometimes in the margin of a chronic leg ulcer. Excision biopsy is essential for accurate diagnosis. Chronic immunosuppression is also a risk factor and they are relatively more common in patients who have received an organ transplant.

Radical surgery and radiotherapy are the treatment of choice. It spreads to distant sites by the lymphatic channels not venous channels.

A	It commonly spreads to distant sites by venous channels

It commonly spreads to distant sites by venous channels is incorrect. It spreads to distant sites by the lymphatic channels, not venous channels.

C	It is commonly seen in patients under 45 years of age

It is commonly seen in patients under 45 years of age is incorrect. Squamous-cell carcinoma of the skin is seldom seen in persons under 45 years of age.

D	It most commonly arises on the torso

It most commonly arises on the torso is incorrect. Squamous-cell carcinoma of the skin is related to UV exposure and usually occurs in sun-exposed areas such as the face and lower lips.

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It commonly spreads to distant sites by venous channels is incorrect. It spreads to distant sites by the lymphatic channels, not venous channels.

C	It is commonly seen in patients under 45 years of age

It is commonly seen in patients under 45 years of age is incorrect. Squamous-cell carcinoma of the skin is seldom seen in persons under 45 years of age.

D	It most commonly arises on the torso

It most commonly arises on the torso is incorrect. Squamous-cell carcinoma of the skin is related to UV exposure and usually occurs in sun-exposed areas such as the face and lower lips.

E	Survival is measured in weeks to months

Survival is measured in weeks to months is incorrect, even advanced SCCs can usually be excised, and distant spread with the consequences of metastasis is rare.

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8:18
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A 62-year-old man came in with fatigue and myalgia. His blood picture showed pancytopenia. Bone marrow aspirate showed normal haemopoietic progenitors with hypocellular picture.

Which one of the following is the appropriate treatment?

A	Anti-thymocyte globulin
B	Bone marrow transplantation
C	Corticosteroids
D	Danazol
E	Oxymetholone

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Video
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8:19
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Explanation

A	Anti-thymocyte globulin

The answer is Anti-thymocyte globulin -

Anti-thymocyte globulin (ATG) is the most appropriate treatment option from those offered. There are some caveats to this, however. This patient has evidence of aplastic anaemia with a hypocellular marrow. Once the diagnosisof aplastic anaemia has been made, the severity of the condition needs to be assessed.Severe aplastic anaemia is defined as marrow cellularity less than 25%, plus at least twoof the following: neutrophils less than 0.5, platelets less than 20, reticulocyte count less than 20. Assuming that this is the case for this question, then ATG would be appropriate. It should be noted that ATG is a highly immunosuppressive treatment. A 62-year-old man would need to be physically fit with no serious co-morbidities to be able to withstand this treatment.

B	Bone marrow transplantation

Bone marrow transplantation (Option B) is incorrect. Bone marrow transplantation is usually only reserved for patients with severeaplastic anaemia with a HLA matched sibling below the age of 50.

C	Corticosteroids

Corticosteroids (Option C) is incorrect. Corticosteroids have no role in the management of aplastic anaemia apart from preventing serum sickness shortly after ATG chemotherapy. They can indeed make the immunosuppressive state worse, pre-disposing to further infections.

D	Danazol

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8:19
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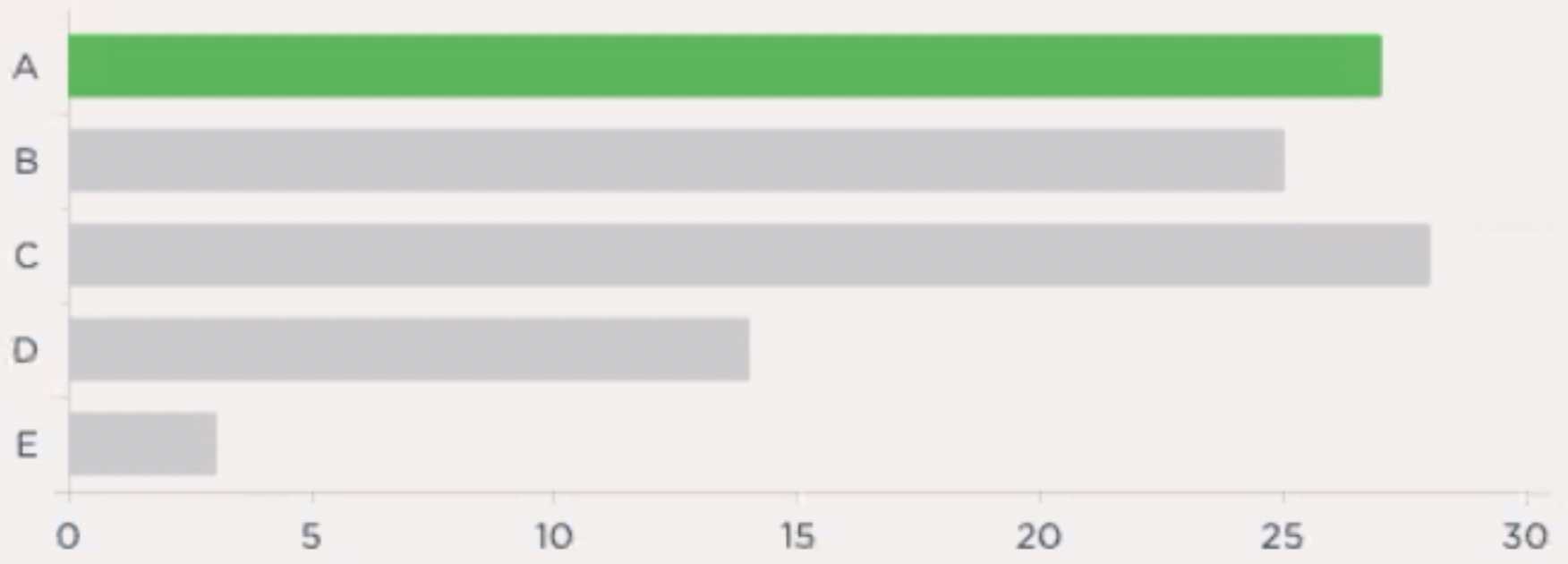
Oxymetholone (Option E) is incorrect. Oxymetholone is more appropriate for use in more elderly patients, and has more masculinising side effects than danazol. Careful monitoring of this drugis required, as it can cause nephrotoxicity, hepatic tumours, mood changes and prostaticenlargement.

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Video
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Participants
More

8:19
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In a patient with raised WBC, RBC and platelet count, which one of the following investigations should be performed to confirm a diagnosis of polycythaemia rubra vera?

A	Abdominal ultrasound
B	Bone marrow
C	JAK2 mutation analysis
D	LDH
E	RBC mass measurement

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8:20
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Question 41 of 286

JAK2 mutation analysis is found in over 95% of patients with primary polycythaemia. It is a simple molecular test to do, which can be performed on peripheral blood. It will distinguish primary polycythaemia from the two other major forms of polycythaemia, secondary polycythaemia and apparent polycythaemia. Both of these are always JAK2 negative.

A	Abdominal ultrasound

Abdominal ultrasound is incorrect. Some rare tumours can secrete erythropoietin and can be associated with secondary polycythaemia. Abdominal ultrasound may be useful in demonstrating splenomegaly. However, JAK2 mutation analysis is now the first line of investigation to confirm a diagnosis of primary polycythaemia.

B	Bone marrow

Bone marrow examination is incorrect. Bone marrow examination sometimes can be useful to demonstrate histological evidence of a myeloproliferative disorder, but this is an invasive and painful test that should be reserved for when there is diagnostic uncertainty.

D	LDH

LDH is incorrect. LDH level can be raised in all forms of myeloproliferative disease, but it is a non-specific test that does not help to confirm the diagnosis of primary polycythaemia.

E	RBC mass measurement

RBC mass measurement is incorrect. Red blood cell mass measurement used to be the gold standard for the diagnosis of primary polycythaemia, demonstrating an increase in red blood production. However, this was a time-consuming test that required radioisotopes. This test has now been superseded by the JAK2

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A 16-year-old patient noticed a swelling on her neck 4 weeks ago. On examination there are several supraclavicular increased lymph nodes as well as a parasternal swelling. The haematological exam shows a neutrophil granulocytosis, neutrophil count 12 × 10^9/litre.

When would you perform a lymph-node biopsy?

A	If there is no reduction of the swelling after 3 weeks of antibiotic therapy
B	After a negative mononucleosis test, tuberculin test and *Yersinia* antibody test
C	After intrathoracic lymph node swelling has been diagnosed
D	Immediately
E	After a 3-week observation period if there is no improvement

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8:21
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Explanation

D	Immediately

This lady has noted significant lymphadenopathy which has lasted for weeks. All neck lumps obviously need to be taken seriously. It should be noted that needle aspirates are of no use in diagnosing lymphoma as one needs to remove the whole node for histological analysis.

A	If there is no reduction of the swelling after 3 weeks of antibiotic therapy

Antibiotic therapy is incorrect. Antibiotic therapy in the absence of any other symptoms is not indicated.

B	After a negative mononucleosis test, tuberculin test and *Yersinia* antibody test

After a negative mononucleosis test, tuberculin test and *Yersinia* antibody test is incorrect. It would be very unusual for this lady to have tuberculosis, but a mononucleosis test might have been considered.

C	After intrathoracic lymph node swelling has been diagnosed

After intrathoracic lymph node swelling has being diagnosed is incorrect. This would not be an indication for lymph node biopsy.

E	After a 3-week observation period if there is no improvement

After a 3-week observation period if there is no improvement incorrect. This young lady has already had a persistent swelling which has lasted 4 weeks.

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8:22
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A 38-year-old man presents with sporadic abdominal Burkitt's lymphoma. You are aware that a specific mutation is likely to be associated with the disease.

Which mutation is it?

A	BCR-ABL
B	BRCA1
C	c-Myc
D	JAK2
E	P53

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D	JAK2
E	P53

Explanation

C	c-Myc

Mutations in the c-myc gene are associated with Burkitt's lymphoma. C-myc is a transcription factor, and occurs on the long arm of chromosome 8. The most common mutation is a translocation to chromosome 14.

A	BCR-ABL

BCR-ABL is incorrect. BCR-ABL is the typical mutation found in chronic myeloid leukaemia.

B	BRCA1

BRCA1 is incorrect. Mutation in BRCA1 is associated with an increased risk of breast cancer and ovarian carcinoma.

D	JAK2

JAK2 is incorrect. JAK2 mutation is found in different myeloproliferative conditions, including primary polycythaemia, essential thrombocythaemia and myelofibrosis.

E	P53

P53 is incorrect. Mutations in P53 are found in a wide array of human cancers, but not specifically Burkitt's lymphoma.

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A 51-year-old man presents for review with lethargy and periodic fevers. He has experienced gradual weight loss and has noticed some lymph nodes appear under his armpits and in his groin. Biopsy of one of the axillary nodes is suggestive of a follicular lymphoma. Immunohistological staining suggests that the lymphocytes are CD20+. He is commenced on standard chemotherapy in conjunction with a monoclonal antibody.

Which drug treatment for non-Hodgkin's lymphoma acts against CD20 lymphocytes?

A	Ciclosporin
B	Gemtuzumab
C	Infliximab
D	Rituximab
E	Trastuzumab

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Previous Question | Skip Question

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Video
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Participants
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8:23
On
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D Rituximab

Rituximab is a monoclonal antibody that is used in a wide array of haematological disorders and acts against CD20-positive lymphocytes. It is used extensively in the treatment of non-Hodgkin's lymphoma but also used in more benign haematological conditions such as immune thrombocytopaenia.

A Ciclosporin

Ciclosporin is incorrect. Ciclosporinis a T-cell immunosuppressant and does not act specifically against CD20 lymphocytes.

B Gemtuzumab

Gemtuzumab is incorrect. Gemtuzumab is an anti-CD33 monoclonal antibody, used in the treatment of acute myeloid leukaemia.

C Infliximab

Infliximab is incorrect. Infliximab is a monoclonal antibody against tumour necrosis factor used to treat autoimmune diseases such as Crohn's disease, ulcerative colitis and rheumatoid arthritis.

E Trastuzumab

Trastuzumab is incorrect. Trastuzumab is known by the trade name of Herceptin. This is a monoclonal antibody againstthe HER2 receptor. Its main use is to treat certain breast cancers.

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A 16-year-old young man with sickle cell anaemia is admitted with recent breathlessness. He is febrile and has a clear chest with saturations of 98% on air. From his outpatient notes his usual Hb is 9 g/dl. FBC taken in the Emergency Department shows WCC 2.6 × $10^3/mm^3$, Hb 4.7 g/dl, platelets 573 × $10^3/mm^3$ with a bilirubin 25 µmol/litre.

Which investigation is the most useful with respect to determining the underlying diagnosis?

A	Serum haptoglobin
B	Urinary haemosiderin
C	Parvovirus serology
D	Reticulocyte count
E	Chest X-ray

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Previous Question | Skip Question

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Video
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Participants
More

8:24
On
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E	Chest X-ray

Explanation

D	Reticulocyte count

This young man has sickle cell anaemia. He normally has a haemoglobin of 9 g/dl, but he has become profoundly anaemic. This could be a haemolytic crisis, but equally well this could be splenic sequestration or an aplastic crisis. His bilirubin is only a little bit raised.

Reticulocyte count is the correct answer. This is a very useful investigation in all forms of anaemia. It is particularly useful if the reticulocyte count is raised. Where there is anaemia with reticulocytosis, it suggests that the bone marrow is working correctly, and that the red blood cells are being destroyed outside the bone marrow. This can be attributed to only two conditions – bleeding or haemolysis. If the bilirubin is normal, this effectively rules out significant haemolysis, and can be a useful pointer to occult bleeding. If the reticulocyte count is normal, it does not often help with the further investigation of anaemia. However, if reticulocytes are very, very low, this would point towards an aplastic crisis, which is an important differential.

C	Parvovirus serology

Parvovirus serology is incorrect. Parvovirus serology may well be helpful, but again it will be a number of days before this result comes back. In the exam, when it says what is 'the most useful investigation' it usually means which is the quickest result that can be obtained in the least invasive manner.

A	Serum haptoglobin

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Serum haptoglobin is incorrect. Serum haptoglobin results takes a great deal of time to come back and will therefore not be useful.

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8:26
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A 17-year-old adolescent is brought to the Emergency Department by her mother who is concerned that she has bruised easily over the past few days and has had a nosebleed this morning. There are no symptoms of other illness and she is otherwise well. On examination there are generalised petechiae and some bruising mainly affecting the lower limbs. Blood testing reveals a platelet count of 35 x 10^9 ((150–400) x 10^9), but the platelets are normal size. Haemoglobin is 11.1 g/dl (11.5–16.5) and her white blood cell count is normal.

What diagnosis fits best with this clinical picture?

A	Generalised bone marrow suppression
B	Haemolytic uraemic syndrome
C	Henoch–Schönlein purpura
D	Idiopathic thrombocytopaenic purpura
E	Thrombotic thrombocytopaenic purpura

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Previous Question Skip Question

Calculator

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D	Idiopathic thrombocytopaenic purpura

This young lady who is clinically well has been bruising over the last couple of days with nose bleeds. There is evidence of generalised petechiae. The platelet count is 35. The young lady is mildly anaemic, with a normal whiteblood cell count. This picture, until proved otherwise, would be compatible with ITP. A careful drug history would be important.

A	Generalised bone marrow suppression

Generalised bone marrow suppression is incorrect. We are told that the white blood cell count is normal, and the haemoglobin is only marginally reduced.

B	Haemolytic uraemic syndrome

Haemolytic uraemic syndrome is incorrect. Haemolytic uraemic syndrome again causes a microangiopathic haemolytic anaemia, and there is nothing to suggest this, such as the development of diarrhoea.

C	Henoch-Schönlein purpura

Henoch-Schönlein purpura is incorrect. Henoch-Schönlein purpura would not cause a low platelet count, as this condition is a vasculitis.

E	Thrombotic thrombocytopaenic purpura

Thrombotic thrombocytopaenic purpura (TTP) is incorrect. TTP would result in a low platelet count, but would also result in a microangiopathic haemolytic anaemia, so the haemoglobin would be expected to be much lower. Patients with TTP are very un which is not the case in this question.

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A 72-year-old woman is seen in the pre-operative Orthopaedic Review Clinic as she has been listed for left total hip replacement in 3 weeks' time. She has a history of hypertension treated with indapamide but is otherwise well. Examination reveals a BP of 125/82 mmHg; pulse is 82/min and regular. There is splenomegaly noted on abdominal examination, and her BMI is 23.

Investigations:

Hb	11.8 g/dl
WCC	52.9 x10^9/l (marked lymphocytosis)
PLT	181 x10^9/l
Na^+	137 mmol/l
K^+	4.3 mmol/l
Creatinine	94 micromol/l
Glucose	5.9 mmol/l
CXR	normal heart size, clear lung fields

Which of the following is the most appropriate next step?

A	Arrange USS abdomen
B	Cancel the surgery pending haematology review
C	Proceed with the surgery without specific intervention for haematological findings
D	Start the patient on alemtuzumab
E	Start the patient on cyclophosphamide

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B	Cancel the surgery pending haematology review

Cancel the surgery pending haematological review would be the most appropriate next step. This lady is not anaemic, has a lymphocytosis and has splenomegaly on examination. She is therefore likely to have a lymphoproliferative disorder such as chronic lymphocytic leukaemia or a low-grade lymphoma. Although it is doubtful that these low-grade lymphoproliferative disorders would impact on the orthopaedic surgery, from a practical point of view most surgeons would like accurate haematological review before proceeding with an elective operation. Therefore, practically speaking, this is the most appropriate next step.

C	Proceed with the surgery without specific intervention for haematological findings

Proceed with the surgery without specific intervention for haematological findings is incorrect. Proceed with the surgery without specific intervention for haematological findings could be adopted if the patient needed an emergency operation. However, this is not the case here. Most surgeons and anaesthetists would prefer to have a better understanding of this lady's lymphocytosis before proceeding with an elective procedure.

A	Arrange USS abdomen

Arrange USS abdomen is incorrect. Arranging an ultrasound scan (USS) of the abdomen will not help. This will simply confirm the splenomegaly that has already been noted on clinical examination.

D	Start the patient on alemtuzumab

Start the patient on alemtuzumab is incorrect. A diagnosis has not been established in this lady, and therefore any consideration treatment before a diagnosis is made is inappropriate.

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A 32-year-old Asian woman is referred to the Haematology Clinic with anaemia. She has rheumatoid arthritis and is currently taking prednisolone, but has recently taken NSAIDs for analgesia. She has a palpable splenomegaly. FBC shows Hb 8.1 g/dl, MCV 69 fl, platelets 154 × 10^3/mm^3, WCC 5.2 × 10^3/mm^3. A bone marrow trephine is stained for iron and shows that iron is present in the developing erythroblasts.

Which one of the following is the likely cause of her anaemia?

A	Iron deficiency
B	Anaemia of chronic disease
C	Sideroblastic anaemia
D	Haemoglobinopathy
E	Myelodysplasia

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Explanation

D	Haemoglobinopathy

The question has specifically stated the ethnic origin of this 32-year-old lady who has a microcytic anaemia associated with palpable splenomegaly. She is not iron deficient, because iron has been demonstrated in the bone marrow trephine.

C	Sideroblastic anaemia

Sideroblastic anaemia is incorrect. It is unusual to occur in such a young lady. This is a form of myelodysplasia, which usually occurs in the elderly.

A	Iron deficiency

Iron deficiency anaemia is incorrect. Iron has been demonstrated in the bone marrow.

B	Anaemia of chronic disease

Anaemia of chronic disease is incorrect. This can cause a microcytic anaemia, and this lady does have rheumatoid arthritis. The fact that the question has specifically stated the ethnic origin of the lady should suggest haemoglobinopathy rather than the anaemia of chronic disease. Haemoglobinopathies are obviously more prevalent in Asian patients compared to White patients. In addition, erythroid pre-cursors show decreased staining for iron as is not seen here.

E	Myelodysplasia

Myelodysplasia again is incorrect for similar reasons. Myelodysplasia would be unusual in this age group, and it usually does not cause palpable splenomegaly.

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8:32
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Which one of the following findings is individually MOST accurate in differentiating chronic myeloid leukaemia (CML) from a leukaemoid reaction?

A	Philadelphia chromosome
B	Splenic enlargement
C	Low leukocyte alkaline phosphatase score
D	Hypercellular bone marrow
E	Elevated platelet count

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8:32
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Explanation

A	Philadelphia chromosome

Identification of the Philadelphia chromosome is the correct way to distinguish between CML and a leukaemoid reaction. This can be achieved quickly through fluorescent in-situ hybridisation (FISH) or by PCR. Identification of the Philadelphia translocation is diagnostic of CML.

C	Low leukocyte alkaline phosphatase score

Low leukocyte alkaline phosphatase score is incorrect. This score is no longer used, and it would be much more important to demonstrate the presence or absence of the Philadelphia chromosome.

B	Splenic enlargement

Splenic enlargement is incorrect. This will not really distinguish between CML and an underlying condition that may be causing a leukaemoid reaction.

D	Hypercellular bone marrow

A hypercellular bone marrow is incorrect. A hypercellular bone marrow will not help. The marrow may simply show expanded granulopoiesis and this will not help in differentiating CML from a leukaemoid reaction.

E	Elevated platelet count

An elevated platelet count is incorrect. Elevated platelet count may be found in both conditions, and will not help distinguish one from the other.

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A 55-year-old woman presents with progressive shortness of breath and ankle swelling. Clinically there is evidence of cardiac failure. Some 15 months ago she was treated with radiotherapy, chemotherapy (including doxorubicin) and hormonal therapy for left breast cancer.

Given her previous history, what diagnosis would you be particularly concerned about?

A	Cardiomyopathy
B	Constrictive pericarditis
C	Long-term side-effect of tamoxifen
D	Pericardial effusion
E	Pulmonary hypertension secondary to multiple pulmonary emboli

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A 55-year-old woman presents with progressive shortness of breath and ankle swelling. Clinically there is evidence of cardiac failure. Some 15 months ago she was treated with radiotherapy, chemotherapy (including doxorubicin) and hormonal therapy for left breast cancer.

Given her previous history, what diagnosis would you be particularly concerned about?

Your answer was correct

A	Cardiomyopathy
B	Constrictive pericarditis
C	Long-term side-effect of tamoxifen
D	Pericardial effusion
E	Pulmonary hypertension secondary to multiple pulmonary emboli

Explanation

A	Cardiomyopathy

The most well-known cause of chemotherapy-induced cardiomyopathy is doxorubicin, which is a member of the anthracycline group of agents. The risk of developing cardiomyopathy is dose-related. Other risk factors include mediastinal irradiation, age greater than 70 years and pre-existing cardiac disease. Monitoring of ejection fraction prior to and during treatment is recommended.

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managed as for CHF due to other causes.

B Constrictive pericarditis

Constrictive pericarditis is incorrect. From the history given there would be no strong reason to suspect constrictive pericarditis.

C Long-term side-effect of tamoxifen

Long-term side-effect of tamoxifen is incorrect. Although it is associated with an increased risk of thrombosis, tamoxifen is not a cardiotoxic drug.

D Pericardial effusion

Pericardial effusion is incorrect. Metastasis of the tumour could lead to a pericardial effusion and, although it would be unlikely, this would need to be excluded as a differential diagnosis.

E Pulmonary hypertension secondary to multiple pulmonary emboli

Pulmonary hypertension secondary to multiple pulmonary emboli is incorrect. There would be no strong reason to suspect pulmonary emboli from the history.

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A 50-year-old man, who has a history of modest alcohol intake (30 units/week), presents complaining of arthralgia and erectile dysfunction that has worsened over the past 6–9 months. On examination he has a deep tan and evidence of chronic liver disease. On investigation:

Hb	14.5 g/dl (13-180)
WCC	8.3 x 10^9/l (4-11 X 10^9) with a normal differential
Platelets	164 x 109/l (150-400 x10^9)
Urea	6.0 mmol/l (2.5-7.5)
Na^+	140 mmol/l (137-144)
K^+	4.2 mmol/l (3.5-4.9)
Creatinine	95 µmol/l (60-110)
AST	65 U/l (1-31)
ALT	82 U/l (5-35)
ALP	135 U/l (45-105)
Bilirubin	23 mmol/l (1-22)
LDH	326 U/l (10-250)
Serum iron	45 µmol/l (14-29)
Total iron-binding capacity	62 µmol/l (45-72)
Ferritin	623 µg/l (15-200)
Glucose	8.8 mmol/l (<7.0)

Which one of the fo...low ...e most likely diagnosis?

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4:33
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Urea	6.0 mmol/l (2.5-7.5)
Na^+	140 mmol/l (137-144)
K^+	4.2 mmol/l (3.5-4.9)
Creatinine	95 µmol/l (60-110)
AST	65 U/l (1-31)
ALT	82 U/l (5-35)
ALP	135 U/l (45-105)
Bilirubin	23 mmol/l (1-22)
LDH	326 U/l (10-250)
Serum iron	45 µmol/l (14-29)
Total iron-binding capacity	62 µmol/l (45-72)
Ferritin	623 µg/l (15-200)
Glucose	8.8 mmol/l (<7.0)

Which one of the following is the most likely diagnosis?

A	Acute viral hepatitis
B	Alcoholic cirrhosis
C	Excess iron ingestion
D	Haemochromatosis
E	Wilson's disease

Annotation
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4:34

D	Haemochromatosis

The man has signs and symptoms of iron overload, including arthralgia and erectile dysfunction. He has skin discoloration and evidence of chronic liver disease. His serum ferritin is significantly raised at 623. It should be noted, however, that liver disease in its own right can cause a significant increase in the serum ferritin.

A	Acute viral hepatitis

Acute viral hepatitis is incorrect. We are told that his symptoms of arthralgia and erectile dysfunction have worsened over the last 6–9 months, which is against an acute infection. The AST and ALT are only very moderately increased as well, and it would be expected to see higher transaminase levels in acute viral hepatitis.

B	Alcoholic cirrhosis

Alcoholic cirrhosis is incorrect. We are told he only has a modest alcohol intake (30 units/week) making this less likely.

C	Excess iron ingestion

Excess iron ingestion is incorrect. Humans only absorb approximately 10% of oral iron intake, so there would have to be significant iron ingestion over a long period of time to result in iron overload.

E	Wilson's disease

Wilson's disease is incorrect. This would not explain the other symptoms of iron overload, such as arthralgia and erectile dysfunction. This recessively inherited disorder of copper metabolism usually presents in childhood or when the patient is a young adult.

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4:36
On
738-627-5670

A 54-year-old woman with breast cancer underwent a wide local excision for an invasive ductal carcinoma 2 years ago. She now presents to the Emergency Department with confusion, lethargy and thigh pain. X-ray reveals a cystic lesion in the shaft of the femur. Her calcium level is 3.5 mmol/l.

Which one of the following is the next step in her therapy?

A	Glucocorticoids
B	Tamoxifen treatment
C	Saline infusion
D	Urgent orthopaedic referral
E	Urgent radiotherapy

43545

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More

C	Saline infusion

The acute management of hypercalcaemia involves general measures to enhance hydration and diuresis, and specific measures using drugs to lower serum calcium. Dehydration due to hypercalcaemic symptoms, for example anorexia, nausea, vomiting and polyuria because of defective urinary concentration, is very common and patients may require 5–10 litres of 0.9% sodium chloride over a period of 24–48 h. This vigorous hydration with normal salinemay lower the serum calcium concentration by 0.25–0.75 mmol/l, and also enhances urinary calcium excretion by increasing glomerular filtration and reducing the proximal and distal renal tubular reabsorption of calcium and sodium.

A loop diuretic, for example, furosemide 20–100 mg, may be required to control complications due to volume overload, especially in the elderly and those with impaired cardiovascular and renal function. Large-volume saline diuresis may lead to hypokalaemia, hypomagnesaemia and electrolyte imbalance, which will need correction.

If saline diuresis is unsuccessful, and particularly if the hypercalcaemia is severe, then more specific measures, for example bisphosphonates or renal dialysis, may be required.

A	Glucocorticoids

Glucocorticoids is incorrect. Glucocorticoids may be indicated to control pain secondary to the bone metastasis but will not correct serum calcium.

B	Tamoxifen treatment

Tamoxifen treatment is incorrect. Tamoxifen may play a role in the long-term management of her metastatic breast cancer but is not indicated acutely to correct hypercalcaemia.

D	Urgent orthopaedic referral

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4:39
On
738-627-5670
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A 62-year-old man presents to his GP for the third time in 6 months complaining of tiredness, lethargy and depression. Finally the GP consents to some blood tests;

Hb	19 g/dl (13–18)
white blood cell count	12.0 × 10^9/l ((4–11) × 10^9/l)
platelets	495 × 10^9/l ((150–400) × 10^9/l)

Past history of note includes gout, which has developed over the past year and was put down to excess alcohol consumption. Plasma volume and leukocyte alkaline phosphatase are also elevated.

What diagnosis fits best with this clinical picture?

A	Haemochromatosis
B	Lymphoma
C	Myelodysplasia
D	Myelofibrosis
E	Primary Polycythemia

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Explanation

E	Primary Polycythemia

This man has other evidence of myeloproliferation, as demonstrated by a raised white cell count and platelet count, and gout is often associated with myeloproliferative disorders.

A	Haemochromatosis

Haemochromatosis is incorrect. Haemochromatosis causes raised body iron levels, but does not actually raise the haemoglobin level.

B	Lymphoma

Lymphoma is incorrect. There is nothing in the question to suggest this clinically, such as the development of weight loss, sweats or lymphadenopathy.

C	Myelodysplasia

Myelodysplasia is incorrect. Myelodysplasia would not give this picture, and would result in cytopaenias, especially anaemia.

D	Myelofibrosis

Myelofibrosis is incorrect. Myelofibrosis generally causes anaemia not polycythemia, and can be also be associated with a pancytopenic picture.

45479

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Where is the most likely location of a primary extra-nodal malignant lymphoma in non-immuno-compromised patients?

A	Kidney
B	Upper gastrointestinal tract
C	Brain
D	Lungs
E	Spleen

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Previous Question | Skip Question

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B Upper gastrointestinal tract

Upper gastrointestinal tract is the most likely location of a primary extra-nodal lymphoma in patients that are not immuno-compromised. The stomach is the most common site of primary gastrointestinal lymphoma, followed by the small intestine. Oesophageal and primary colorectal lymphomas are rare.

C Brain

Brain is incorrect – this is not the most likely location of a primary extra-nodal malignant lymphoma in a non-immunocompromised patient.

A Kidney

Kidney is incorrect – this is not the most likely location of a primary extra-nodal malignant lymphoma in a non-immunocompromised patient.

D Lungs

Lungs is incorrect – this is not the most likely location of a primary extra-nodal malignant lymphoma in a non-immunocompromised patient.

E Spleen

Spleen is incorrect – this is not the most likely location of a primary extra-nodal malignant lymphoma in a non-immunocompromised patient.

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Which one of the following features is MOST helpful in distinguishing β-thalassaemia trait from iron deficiency anaemia (IDA)?

A	Microcytosis
B	Haemoglobin A2 levels
C	Reduced haematocrit
D	Splenomegaly
E	Target cells on peripheral blood-film examination

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Previous Question | Skip Question

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B	Haemoglobin A2 levels

The haemoglobin A2 level is the most helpful test in distinguishing the beta thalassaemia trait from iron deficiency anaemia. Raised haemoglobin A2 levels are diagnostic of a beta thalassaemia trait. Iron deficiency lowers the percentage of haemoglobin A2, both in individuals with no defective globin production and in those with the thalassaemia trait.

A	Microcytosis

Microcytosis is incorrect. Microcytosis is encountered in both conditions.

C	Reduced haematocrit

Reduced haematocrit is incorrect. Reduced haematocrit is encountered in both conditions.

D	Splenomegaly

Splenomegaly is incorrect. Splenomegaly is not helpful in distinguishing the two conditions.

E	Target cells on peripheral blood-film examination

Target cells on peripheral blood-film examination is incorrect. Target cells may be encountered in both conditions on the peripheral blood film.

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A 58-year-old woman was admitted with a pulmonary embolism. After 7 days she has developed an arterial thrombosis in her left leg: her thrombocyte count is 40 × 10^9/litre.

Which one of the following is the most likely diagnosis?

A	Acute adrenal insufficiency
B	Disseminated intravascular coagulation
C	Heparin-induced thrombocytopenia
D	Immune thrombocytopenic purpura
E	Thrombotic thrombocytopenic purpura

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C	Heparin-induced thrombocytopenia
D	Immune thrombocytopenic purpura
E	Thrombotic thrombocytopenic purpura

Explanation

C	Heparin-induced thrombocytopenia

The presentation is typical. She will have been treated with low molecular weight heparin at treatment doses for the pulmonary embolism and then has subsequently developed an arterial thrombosis associated with thrombocytopenia. The management should be cessation of the low molecular weight heparin, demonstration of antibodies against heparin/platelet factor IV complexes and institution of an alternative anticoagulant such as argatroban or fondaparinux.

A	Acute adrenal insufficiency

Acute adrenal insufficiency is incorrect. This has nothing to do with coagulation.

B	Disseminated intravascular coagulation

Disseminated intravascular coagulation is incorrect. The question is pointing to a complication of the use of heparin.

D	Immune thrombocytopenic purpura

Immune thrombocytopenia purpura is false because this lady has an arterial thrombosis but a paradoxical thrombocytopenia.

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A 72-year-old presents to his GP with anorexia, weight loss and increasing lethargy. He also complains of Raynaud's phenomenon and increasing headaches over the past few months. Apart from a history of hypertension there is no other significant past medical history. On examination his BP is 155/92 mmHg. You detect hepatosplenomegaly on examination of the abdomen.

Investigations:

Hb	102 g/l
WCC	11.1 x 10^9/l
PLT	104 x 10^9/l
Na^+	142 mmol/l
K^+	4.9 mmol/l
Creatinine	198 umol/l
Plasma viscosity	2.9 mPa/s (1.5-1.72)
Total protein	82 g/l (61-76)
IgM	Paraprotein band
Urate	0.62 mmol/l (0.23-0.46)

Given his likely underlying diagnosis, which one of the following events poses the most serious risk to this patient?

A	Disseminated herpes zoster infection
B	Hyperviscosity syndrome
C	Invasive aspergillosis

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A 72-year-old presents to his GP with anorexia, weight loss and increasing lethargy. He also complains of Raynaud's phenomenon and increasing headaches over the past few months. Apart from a history of hypertension there is no other significant past medical history. On examination his BP is 155/92 mmHg. You detect hepatosplenomegaly on examination of the abdomen.

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IgM	Paraprotein band
Urate	0.62 mmol/l (0.23-0.46)

Given his likely underlying diagnosis, which one of the following events poses the most serious risk to this patient?

A Disseminated herpes zoster infection

B Hyperviscosity syndrome

C Invasive aspergillosis

D Meningococcal sepsis

E Severe anaemia

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4:43
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B	Hyperviscosity syndrome

This elderly man has hepatosplenomegaly, with anaemia. He has a raised plasma viscosity, a raised total protein in the plasma, with an associated IgM paraprotein. This would suggest Waldenstrom's macroglobulinaemia, a lymphoproliferative disorder associated with an IgM paraprotein. The viscosity here is not very high, but it can rise as the IgM paraprotein rises, causing problems with hyperviscosity.

A	Disseminated herpes zoster infection

Disseminated herpes zoster infection is incorrect. Disseminated herpes zoster infection is not the most serious risk in Waldenstrom's macroglobulinaemia.

C	Invasive aspergillosis

Invasive aspergillosis is incorrect. Invasive aspergillosis is of particular risk for people who are profoundly neutropaenic for many weeks or months, for example, those patients undergoing acuteleukaemia treatment, or allogeneic bone marrow transplantation.

D	Meningococcal sepsis

Meningococcal sepsis is incorrect. Meningococcal sepsis is a particular risk for patients who are asplenic.

E	Severe anaemia

Severe anaemia is incorrect. Patients with Waldenstrom's macroglobulinaemia can be anaemic, but hyperviscosity is the more serious risk, with risks of both cerebrovascular and cardiovascular events.

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A 32-year-old woman who has been treated for 4 days with heparin for a pulmonary embolus suffers a decreasing platelet count (190 on admission, to 40 on latest testing), and a right arm venous thrombosis. You suspect heparin-induced thrombocytopaenia (HIT).

Which of the following autoantibodies are responsible for the development of HIT Type 2?

A	Anti-endothelial antibodies
B	Anti-nuclear antibodies
C	Anti-parietal cell antibodies
D	Anti-PF4-heparin antibodies
E	Anti-platelet antibodies

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D	Anti-PF4-heparin antibodies

Antibodies directed against the PF4–heparin complex are found in over 90% of patients suffering from HIT. Heparin-inducedthrombocytopaenia typically occurs 5–10 days after the administration of heparin, with a falling platelet count that can be associated with both venous and arterial thrombotic events.

A	Anti-endothelial antibodies

Anti-endothelial antibodies is incorrect. Anti-endothelial antibodies are not responsible for the development of HIT Type 2.

B	Anti-nuclear antibodies

Anti-nuclear antibodies is incorrect. Anti-nuclear antibodies are not responsible for the development of HIT Type 2.

C	Anti-parietal cell antibodies

Anti-parietal cell antibodies is incorrect. Anti-parietal cell antibodies are associated with pernicious anaemia.

E	Anti-platelet antibodies

Anti-platelet antibodies is incorrect. Anti-platelet antibodies are not responsible for the development of HIT Type 2.

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Enoxaparin has just been recommended as the low molecular weight heparin of choice in your hospital trust.

Which of the following represents the primary mechanism of action for low molecular weight heparin?

A	Binds to anti-thrombin III
B	Binds to factor II
C	Binds to factor VIII
D	Binds to factor X
E	Binds to Von Willebrand factor (VWF)

47247

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Previous Question | Skip Question

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A	Binds to anti-thrombin III

The primary mechanism of action for low molecular weight heparin is binding to anti-thrombin.

Low molecular weight heparins inhibit the coagulation process through binding to anti-thrombin via a pentasaccharide sequence. This binding leads to a conformational change of anti-thrombin, which accelerates its inhibition of activated Xa.

B	Binds to factor II

Binds to factor II is incorrect. Binding to factor II, also known as prothrombin, is false. The primary mechanism of action for low molecular weight heparin is binding to anti-thrombin.

C	Binds to factor VIII

Binds to factor VIII is incorrect. The primary mechanism of action for low molecular weight heparin is binding to anti-thrombin.

D	Binds to factor X

Binds to factor X is incorrect. The primary mechanism of action for low molecular weight heparin is binding to anti-thrombin.

E	Binds to Von Willebrand factor (VWF)

Binds to Von Willebrand factor (VWF) is incorrect. The primary mechanism of action for low molecular weight heparin is binding to anti-thrombin.

47247

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A 22-year-old woman from the USA falls profoundly ill while visiting relatives in the UK. She is admitted unconscious with a purpuric rash after waking earlier complaining of severe headache and neck pain. She currently takes 20 mg prednisolone. On examination she has abdominal laparoscopic scars and her blood film shows hyposplenic features.

What is the most likely indication for this woman's prior splenectomy?

A	Beta-thalassaemia trait
B	Gaucher's disease
C	Hodgkin's disease
D	Immune thrombocytopaenic purpura
E	Sickle cell disease

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D	Immune thrombocytopaenic purpura

This is quite a difficult question. We are told that this lady has a purpuric rash, headache and neck pain. This would be consistent with the development of meningitis, with meningococcal sepsis. We are told that this lady has a prior splenectomy, and the blood film shows hyposplenic features. This has been done through a laparoscopic approach in the past.

Immune thrombocytopaenic purpura is the most likely indication for this woman's prior splenectomy. It is a very effective operation for immune thrombocytopaenia that has not responded to first-line steroids.

A	Beta-thalassaemia trait

Beta-thalassaemia trait is incorrect. Beta-thalassaemia trait is an asymptomatic condition, leading to a mild hypochromic microcytic anaemia, and splenectomy is not indicated for this.

B	Gaucher's disease

Gaucher's disease is incorrect. Gaucher's disease does cause splenomegaly, but treatment is with replacement enzyme therapy, and would not be a very common reason to perform a splenectomy.

C	Hodgkin's disease

Hodgkin's disease is incorrect. Open splenectomy and lymph node biopsies were performed up until the mid-1970s. This was to document the stage of the disease before the invention of CT scans.

E	Sickle cell disease

Sickle cell disease is incorrect. Sickle cell disease results in an asplenic state due to progressive splenic infarction [illegible] of the repeated vaso-occlusive events in the splenic micro-circulation.

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A 73-year-old man with prostate cancer is under the management of the oncology clinic.

Which one of the following laboratory tests is most useful for screening and therapy control in this patient?

A	α-Fetoprotein
B	Alkaline phosphatase
C	Carcinoembryonic antigen
D	Lactate dehydrogenase
E	Prostate-specific antigen

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Previous Question Skip Question

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E	Prostate-specific antigen

The introduction of the prostate-specific antigen (PSA) test has led to increasing public awareness of prostate cancer, and, as a consequence, diagnosis is increasingly made before metastases into lymph nodes or bone are evident. Bone metastases are very unlikely unless the PSA exceeds 20 ng/ml, and a bone scan at diagnosis is unnecessary in patients whose PSA is below 20 ng/ml.

Large numbers of cancers are now diagnosed following a PSA test at a stage before they are palpable (category T1c) by transrectal ultrasound biopsy. The usual indication for biopsy is a PSA exceeding 4 ng/ml. PSA is also useful for monitoring response to therapy in patients with carcinoma of the prostate.

A	α-Fetoprotein

Alpha-fetoprotein is incorrect. Alpha-fetoprotein is used in the management of germ cell tumours and hepatocellular carcinomas.

B	Alkaline phosphatase

Alkaline phosphatase is incorrect. Alkaline phosphatase is a marker for germ cell tumours and bony metastases from any malignancy.

C	Carcinoembryonic antigen

Carcinoembryonic antigen is incorrect. Carcinoembryonic antigen is a marker for colorectal cancer.

D	Lactate dehydrogenase

Lactate dehydrogenase is incorrect. Lactate dehydrogenase is used in the management of lymphomas and germ cell tumours.

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A 65-year-old man comes to the clinic for evaluation of painless cervical lymphadenopathy. His only other past medical history of note is essential hypertension for which he takes amlodipine 5 mg daily. On examination his BP is 145/80 mmHg, pulse is 75/min and regular. There is bilateral cervical lymphadenopathy, with a number of nodes 1 cm in diameter or greater. Investigations:

Hb	101 g/l
WCC	7.5 x 10^9/l
PLT	135 x 10^9/l
Na^+	138 mmol/l
K^+	4.2 mmol/l
Creatinine	120 micromol/l
ESR	70 mm/1st hour

Which of the following is the most appropriate investigation for determining prognosis in this case?

A	CT head and neck
B	Excision biopsy of a lymph node
C	Fine needle aspiration biopsy
D	Lumbar puncture
E	Peripheral blood cytogenetics

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Explanation

B	Excision biopsy of a lymph node

Essentially, this man has lymphadenopathy that needs further evaluation. The main differential diagnosis is between metastatic carcinoma and lymphoma. A full lymph node biopsy is required to determine the exact sub-type of lymphoma. An accurate diagnosis of the sub-type of lymphoma will be the most important aspect of determining prognosis.

C	Fine needle aspiration biopsy

Fine needle aspiration biopsy is incorrect. Fine needle aspiration biopsy is an inadequate investigation in determining the sub-type of lymphoma, which is the next most important step in this man's management.

A	CT head and neck

CT head and neck is incorrect. CT head and neck would just further delineate the extent of the lymphadenopathy, but will not give an idea of the underlying diagnosis.

D	Lumbar puncture

Lumbar puncture is incorrect. Although the presence of disease in the central nervous system is often a poor prognostic factor in lymphoma, the most important aspect to determine prognosis is to document the exact sub-type of lymphoma and that is best done by excision biopsy of a lymph node.

E	Peripheral blood cytogenetics

Peripheral blood cytogenetics is incorrect. Peripheral blood cytogenetics can only be used really to dete sis in acute leukaemias, when there are a substantial number of blast

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Limited stage small-cell carcinoma of the lung is diagnosed in a 66-year-old patient. The patient is a smoker with background chronic obstructive pulmonary disease.

Which one of the following is the best therapeutic action to improve her survival?

A	Chemotherapy and radiotherapy in combination
B	Hormone therapy with oestrogen
C	Lobectomy of the affected lung
D	Pneumonectomy of the affected lung
E	Radiotherapy

45534

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Previous Question | Skip Question

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Explanation

A	Chemotherapy and radiotherapy in combination

Small-cell lung cancer (SCLC) is highly sensitive to cytotoxic chemotherapy with a significantly higher response rate than non-small-cell lung cancers. Combination chemotherapy with a platinum agent and etoposide is given for four cycles concurrently with thoracic radiotherapy.

A complete response (ie disappearance of all measurable disease) is achieved in 40–50% of cases and a partial response (greater than a 50% reduction in tumour bulk) in a further 40%, giving a total response rate of 80–85%. Median survival has been extended to 14–18 months for limited disease and to 9–12 months for extensive disease.Most patients will experience some nausea and vomiting, and alopecia is practically universal. Life-threatening septicaemia occurs in 1–4% of patients, but treatment-related deaths are uncommon.

B	Hormone therapy with oestrogen

Hormone therapy with oestrogen is incorrect. Hormonal/oestrogen therapy is never indicated in SCLC.

C	Lobectomy of the affected lung

Lobectomy of the affected lung is incorrect. The COPD would limit this patient's suitability for surgery as described.

D	Pneumonectomy of the affected lung

Pneumonectomy of the affected lung is incorrect. Surgery is indicated in selected stage I SCLC patients with good performance status, in this case COPD would limit the patient's suitability for surgery. In reality surgery is rarely performed for SCLC due to the small minority of cases which present at such an ea ge.

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A 72-year-old lady with confirmed anaplastic thyroid carcinoma is being screened for metastases.

Which one of these organs is the most likely to be involved with metastases?

A	Breast
B	Kidney
C	Lung
D	Oesophagus
E	Spleen

40213

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Previous Question | Skip Question

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C Lung

Anaplastic carcinoma of the thyroid is the most aggressive primary tumour of the thyroid gland. It represents less than 2% of all thyroid cancers, ranging from 1.2 to 3.8 per 100 000 individuals.

Clinically, most patients have a dominant fixed mass of 5 cm or more in diameter, multiple other nodules in both thyroid lobes and enlarged lymph nodes. Around 50% of patients have distant metastases, most commonly in the lungs but also in the bones, liver and brain. Metastases to the breast, kidney, oesophageus and spleen are rare.

D Oesophagus

Oesophagus is incorrect. Metastases to the oesophageus are rare.

A Breast

Breast is incorrect. Metastases to the breast are rare.

B Kidney

Kidney is incorrect. Metastases to the kidney are rare.

E Spleen

Spleen is incorrect. Metastases to the spleen are rare.

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A 58-year-old woman who has suffered two ischaemic strokes is started on phenytoin for recurrent seizures. She is suffering from extreme tiredness and has noticed increasing bruising over the past few weeks. Other medication includes ramipril 10 mg daily and clopidogrel one tablet daily.

Investigations:

Hb	82 g/l
MCV	102 fl
WCC	2.3 x 10^9/l
Platelets	38 x 10^9/l
Na^+	140 mmol/l
K^+	4.6 mmol/l
Creatinine	135 µmol/l

What is the most likely diagnosis?

A	Clopidogrel-induced pancytopaenia
B	Haemolytic anaemia
C	Myelodysplasia
D	Myelofibrosis
E	Phenytoin-induced pancytopaenia

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E Phenytoin-induced pancytopaenia

The blood count abnormalities are linked in time with starting phenytoin for recurrent seizures. This can be associated with a pancytopaenia.

A Clopidogrel-induced pancytopaenia

Clopidogrel-induced pancytopaenia is incorrect. Clopidogrel-induced pancytopaenia can be associated with an aplastic anaemia, although the time course of events suggests that phenytoin is the most likely causative agent here.

B Haemolytic anaemia

Haemolytic anaemia is incorrect. The white cell count and platelet count are also reduced, suggesting a more widespread problem affecting the marrow. There are no other clinical or laboratory features of haemolytic anaemia, such as jaundice or a raised reticulocyte count.

C Myelodysplasia

Myelodysplasia is incorrect. This question suggests that the commencement of phenytoin is responsible for her current symptoms and blood count abnormalities.

D Myelofibrosis

Myelofibrosis is incorrect. This question suggests that the commencement of phenytoin is responsible for her current symptoms and blood count abnormalities.

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You are called to see a man who suddenly develops fever, chills and lower back pain while receiving a blood transfusion on the ward.

Which one of the following is the next step in his management?

A	Intravenous corticosteroids
B	Intravenous antibiotics
C	Blood cultures
D	Stop the transfusion
E	Intravenous fluids

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Explanation

D	Stop the transfusion

This man is developing a serious blood transfusion reaction.

Stop the transfusion is the most appropriate answer. His symptoms are suggestive of an acute intravascular haemolytic transfusion reaction. Further management should be checking the patient's identity against the transfused bag of blood. Blood samples should be taken for blood count, biochemistry profile, coagulation profile including serum fibrinogen and a direct Coomb's test. The implicated bag of blood should also be sent back to the transfusion laboratory. Close monitoring of vital signs is critical and this should be reported as a clinical incident if it is demonstrated that ABO incompatible blood has been transfused.

A	Intravenous corticosteroids

Intravenous corticosteroids is incorrect, nothing should come before stopping the blood transfusion from progressing any further.

B	Intravenous antibiotics

Intravenous antibiotics is incorrect, nothing should come before stopping the blood transfusion from progressing any further.

C	Blood cultures

Blood cultures is incorrect, nothing should come before stopping the blood transfusion from progressing any further.

E	Intravenous fluids

Intravenous fluids is incorrect, nothing should come before stopping the blood transfusion from progressing any further.

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4:55

A 72-year-old non-smoker presents with bone pain, constipation and malaise. Baseline investigations reveal an elevated serum calcium. Physical examination was normal.

Which tumour marker investigation might be most useful for this man?

A	Alpha-fetoprotein (AFP)
B	Beta-subunit of human chorionic gonadotropin (β-hCG)
C	CA 19-9
D	Carcinoembryonic antigen (CEA)
E	Prostate-specific antigen (PSA)

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Previous Question Skip Question

Calculator

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E	Prostate-specific antigen (PSA)

A man of advanced age presenting with bony metastases is most likely to have metastatic prostate cancer. With the possible exception of prostate-specific antigen (PSA), tumour markers do not have sufficient sensitivity or specificity for use in screening. PSA can be used to screen for prostate cancer, although population screening is controversial. It can also be used to detect recurrence of the malignancy, and is useful in the investigation of adenocarcinoma of unknown primary.

A	Alpha-fetoprotein (AFP)

Alpha-fetoprotein is incorrect. Combined AFP and β-hCG testing is an important component in the evaluation and treatment of non-seminomatous germ-cell tumours, and in monitoring the response to therapy. AFP and β-hCG also may be useful in evaluating potential origins of poorly differentiated metastatic cancer.

B	Beta-subunit of human chorionic gonadotropin (β-hCG)

Beta-subunit of human chorionic gonadotropin is incorrect. Combined AFP and β-hCG testing is an important component in the evaluation and treatment of non-seminomatous germ-cell tumours, and in monitoring the response to therapy. AFP and β-hCG also may be useful in evaluating potential origins of poorly differentiated metastatic cancer.

C	CA 19-9

CA 19-9 is incorrect. CA 19-9 may be helpful in establishing the nature of pancreatic masses.

D	Carcinoembryonic antigen (CEA)

Carcinoembryonic antigen is incorrect. Carc[illegible] antigen is

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Which malignancy is currently the number one cause of death in women in the United Kingdom?

A	Breast cancer
B	Colon cancer
C	Leukaemia
D	Lung cancer
E	Uterine cancer

45537

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D	Lung cancer

Cancer is the cause of 26% of deaths in the UK, and is a more common cause of death than cardiovascular disease. Lung cancer, with its low survival rates, is the biggest cancer killer in the UK, although breast cancer has the highest incidence. In 2012 over one-fifth (21%) of all cancer deaths in women were from lung cancer, 15% from breast cancer, 9% from colon cancer. Leukaemia and uterine cancer are rarer, each accounting for approximately 3% of cancer deaths in women.

In males the most common cause of cancer death is also lung cancer (23%), with prostate (13%) and colon cancer (10%) also causing significant mortality.

On average 92 people die every day from lung cancer in the UK. Cigarette smoking has been identified as the single most important cause of preventable disease and premature death in the UK. Overall, one-third of all cancer deaths are linked to smoking.

B	Colon cancer

Colon cancer is incorrect. Colon cancer accounted for approximately 9% of cancer deaths in women.

A	Breast cancer

Breast cancer is incorrect. Although, as described, breast cancer has the highest incidence, it accounts for 15% of cancer deaths in women compared to 26% for lung cancer.

C	Leukaemia

Leukaemia is incorrect. Leukaemia accounted for approximately 3% of cancer deaths in women.

E	Uterine cancer

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Fibrinogen	2.1 g/l (normal range 2–5)

The reptilase time was 16 s (normal range 15–18), FDP 10 µg/ml (normal range < 10). Coagulation screen prior to surgery had been considered normal.

Which one of the following is the cause of the observed coagulation abnormality?

A	Acquired haemophilia
B	Coagulation factor deficiency due to dilution
C	Disseminated intravascular coagulation
D	Heparin in the sample
E	'Surgical bleeding'

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You are contacted by the cardiothoracic StR for advice about a surgical patient. A 65-year-old man had an aortic valve replacement and coronary artery bypass grafting earlier in the day. The operation was uneventful but the patient has continued to ooze from his wounds and is bleeding considerable amounts into drains. You are told that his haematology is as follows:

Hb	10.7 g/dl
WCC	14.2 × 10^9/l
Platelets	136 × 10^9/l
PT	16 s (normal range 12–17)
APTT	72 s (normal range 24–38)
TT	32 s (normal range 14–22)
Fibrinogen	2.1 g/l (normal range 2–5)

The reptilase time was 16 s (normal range 15–18), FDP 10 µg/ml (normal range < 10). Coagulation screen prior to surgery had been considered normal.

Which one of the following is the cause of the observed coagulation abnormality?

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D	Heparin in the sample
E	'Surgical bleeding'

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5:00
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D Heparin in the sample

This patient has a normal prothrombin time with a markedly elevated APTT. The patient will have multiple lines in situ, which will be anticoagulated with unfractionated heparin. Samples that have been contaminated with heparin always need to be considered despite the fact that the patient is having ongoing bleeding. Elevated thrombin time with a normal reptilase time is also typical of unfractionated heparin contamination. The next step should be to take a new sample for coagulation analysis direct by venepuncture from a peripheral vein.

B Coagulation factor deficiency due to dilution

Coagulation factor deficiency due to dilution is incorrect. Coagulation factor deficiency due to dilution is again possible, but the prothrombin time is normal in the presence of a markedly raised APTT which is against this diagnosis.

A Acquired haemophilia

Acquired haemophilia is incorrect. This is a very rare disorder and would be not consistent with the clinical situation.

C Disseminated intravascular coagulation

Disseminated intravascular coagulation is incorrect. Disseminated intravascular coagulation is a possibility in sick patients. However, one might expect the platelet count to be lower, with a prolonged thrombin time as well as a prolonged APTT. One would expect a lower fibrinogen level, with increased fibrinogen degradation products (also known as D-dimers).

E 'Surgical bleeding'

Surgical bleeding is incorrect. This is when there is ongoing

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5:02
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A 25-year-old white woman presents to the Emergency Department with the complaint of extreme shortness of breath of acute onset. She was actually seen in the same Emergency Department 24 h previously where she was diagnosed with a urinary tract infection and given a prescription for co-trimoxazole. She is overweight and sedentary and smokes two packs of cigarettes per day. On physical exam she is markedly dyspnoeic and extremely cyanotic. Arterial blood gases fail to reveal any hypoxia, but a ventilation-perfusion scan is obtained anyway, which is read as low probability.

Which one of the following should be the next course of action?

A	Administer methylene blue
B	Begin anticoagulation
C	Proceed to pulmonary arteriography
D	Repeat the arterial blood gas to look for progression and development of hypoxia
E	Transfuse two units of packed RBCs

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Previous Question Skip Question

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Explanation

A	Administer methylene blue

This lady is extremely cyanotic but not hypoxic. This combination should raise the possibility of methaemoglobinaemia. In this case, the patient has been exposed to a sulfonamide, which may be associated with increased levels of methaemoglobin in susceptible individuals. Prompt institution of methylene blue is appropriate. Individuals will respond rapidly to this, with resolution ofthe cyanosis.

B	Begin anticoagulation

Begin anticoagulation is incorrect. There is no definite evidence here thus far of a venous thrombotic event that would warrant anticoagulation.

C	Proceed to pulmonary arteriography

Proceed to pulmonary arteriography is incorrect. Pulmonary arteriography is an invasive procedure. It is not undertaken lightly. If one was considering a very significant pulmonary embolism, the ventilation-perfusion scan would be unlikely to be negative.

D	Repeat the arterial blood gas to look for progression and development of hypoxia

Repeat the arterial blood gas to look for progression and development of hypoxia is incorrect. The original blood gas sample has not shown any hypoxia, and this lady needs treatment with methylene blue for methaemoglobinaemia, not a further arterial blood gas.

E	Transfuse two units of packed RBCs

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5:05
On
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Hyposplenism is seen least often in which one of the following conditions?

A	Sickle cell disease
B	Coeliac disease
C	Systemic lupus erythematosus
D	Thalassaemia major
E	Dermatitis herpetiformis

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Explanation

D	Thalassaemia major

Thalassaemia major results in extramedullary haemopoiesis and enlargement of the spleen. This would also be known as hypersplenism. The other conditions are associated with hyposplenism.

A	Sickle cell disease

Sickle cell disease is incorrect. Hyposplenism does occur in this condition in childhood due to obstruction of the splenic blood vessels with sickle cells and resulting splenic atropy.

B	Coeliac disease

Coeliac disease is well associated with a hyposplenic state.

C	Systemic lupus erythematosus

Systemic lupus erythematosus is also associated with a hyposplenic state.

E	Dermatitis herpetiformis

Dermatitis herpetiformis is also well recognised with hyposplenism.

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You are on call and are contacted by the gynaecology StR. A 23-year-old woman has a ruptured ovarian cyst and needs to go to theatre soon. She has mild von Willebrand's disease and has had previous operative procedures carried out without requiring blood products. She had a trial of DDAVP electively, with a satisfactory rise in her von Willebrand factor levels.

Hb	12.5 g/dl (11.5–16.5)
WCC	5.2 × 10^9/l ((4–11) × 10^9)
Platelets	190 × 10^9/l ((150–400) × 10^9)
PT	15 s (12–17)
APPT	40 s (24–38)
TT	17 s (14–22),
fibrinogen	3.1 g/l (2–5)

Which one of the following would be the most appropriate management of the surgery?

A	Blood transfusion
B	DDAVP and tranexamic acid
C	Transfusion of fresh-frozen plasma
D	Transfusion of haemate P
E	Transfusion of platelets

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Explanation

B DDAVP and tranexamic acid

DDAVP and tranexamic acid will probably be sufficient. We have been told that this lady has had previous operative procedures before, without running into problems and without requiringblood products. We are also told that an elective outpatient trial of DDAVP, which is given on the day case unit and the levels measured, shows a good response. This would therefore be the preferred treatment, which will not expose the lady to blood products.

A Blood transfusion

Blood transfusion is incorrect. A blood transfusion will not improve her haemostatic parameters in any way.

C Transfusion of fresh-frozen plasma

Transfusion of fresh-frozen plasma is incorrect. This is not an effective treatment for von Willebrand's disease.

D Transfusion of haemate P

Transfusion of haemate P is incorrect. Transfusion of haemate P contains factor VIII as well as von Willebrand factor. We are told, however, that this lady has responded very well in the past to DDAVP, so this perhaps would not be the most ideal treatment. It may be required if there was still ongoing bleeding despite DDAVP and tranexamic acid initially.

E Transfusion of platelets

Transfusion of platelets is incorrect. This lady has a [illegible] platelet count at 190.

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5:07

A woman who is 34 weeks' pregnant presents to the clinic complaining that she sustained a minor knock to her arm, yet now has quite a severe bruise. Her pregnancy has been unremarkable so far. Her BP is 124/71 mmHg. She has large bruise on her left forearm. Otherwise the examination is normal.

Investigations:

Hb	110 g/l
WCC	5.6 x 10^9/l
PLT	72 x 10^9/l
Na^+	139 mmol/l
K^+	4.4 mmol/l
Creatinine	85 µmol/l

Which one of the following is the most appropriate intervention?

A	Arrangements should be made to deliver the baby
B	No intervention is necessary
C	She should be given CMV-depleted platelets
D	She should be given irradiated platelets
E	She should be started on prednisolone

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B	No intervention is necessary

This lady is very well. Her haemoglobinand white cell count look respectable, but she has a thrombocytopaenia. This is likely to be simple gestational thrombocytopaenia and is very common. Most importantly, the patient should be closely monitored from the present time until she delivers, and invasive fetal monitoring is not indicated.

E	She should be started on prednisolone

She should be started on prednisolone is incorrect. The platelet count is very mildly reduced,and demands no specific intervention at this moment in time. Steroids may only need to be considered if the platelet count is persistently less than 30 within the last 2 weeks of pregnancy. Steroids may be considered in the last couple of weeks of pregnancy to raise the platelet count temporarily so that a caesarean section or epidural anaesthesia may be undertaken safely. This may well be combined with intravenous immunoglobulin,but at this platelet count and at this stage of pregnancy, steroids would not be indicated.

A	Arrangements should be made to deliver the baby

Arrangements should be made to deliver the baby is incorrect. This is not required for simple gestational thrombocytopaenia.

C	She should be given CMV-depleted platelets

She should be given CMV-depleted platelets is incorrect. She does not need any platelets at all at this moment in time.

D	She should be given irradiated platelets

She should be given irradiated platelets is incorrect. She does not need any platelets at all at this moment in time.

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A 71-year-old man is admitted to the ambulatory clinic at the local Emergency Department with a swollen left lower leg. He has just returned from a cruise and said that his leg has become progressively more swollen and painful over the past few days. He has also suffered from increasing headaches over the past few months, but put this down to poor control of his blood pressure. Examination reveals a BP of 155/90 mmHg, pulse is 80/min and regular. There is obvious plethora. Respiratory and cardiovascular examinations are normal, abdominal examination reveals splenomegaly. O_2 saturation 95% on pulse oximeter. Investigations:

Hb	19.1 g/dl
WCC	17.2 x 10^9/l
PLT	535 x 10^9/l
Ferritin	8 microg/l
ESR	12 mm/1st hour
Na^+	138 mmol/l
K^+	4.8 mmol/l
Creatinine	124 micromol/l

Which of the following is the most likely diagnosis?

A	B-cell lymphoma
B	Chronic lymphocytic leukaemia
C	Chronic myeloid leukaemia
D	Primary polycythaemia

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A 71-year-old man is admitted to the ambulatory clinic at the local Emergency Department with a swollen left lower leg. He has just returned from a cruise and said that his leg has become progressively more swollen and painful over the past few days. He has also suffered from increasing headaches over the past few months, but put this down to poor control of his blood pressure. Examination reveals a BP of 155/90 mmHg, pulse is 80/min and regular. There is obvious plethora. Respiratory and cardiovascular examinations are normal, abdominal examination reveals splenomegaly. O_2 saturation 95% on pulse oximeter. Investigations:

Hb	19.1 g/dl
WCC	17.2 x 10^9/l
PLT	535 x 10^9/l
Ferritin	8 microg/l
ESR	12 mm/1st hour
Na^+	138 mmol/l
K^+	4.8 mmol/l
Creatinine	124 micromol/l

Which of the following is the most likely diagnosis?

A	B-cell lymphoma
B	Chronic lymphocytic leukaemia
C	Chronic myeloid leukaemia
D	Primary polycythaemia
E	Secondary polycythaemia

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D	Primary polycythaemia

It sounds as if this man has evidence of a left DVT. His haemoglobin is raised, and there is evidence of other myeloproliferation,with a raised white cell count and platelet count. He is also iron deficient. He in addition has evidence of splenomegaly on examination. All of these features therefore suggest primary polycythaemia, also known as polycythaemia rubra vera.

A	B-cell lymphoma

B-cell lymphoma is incorrect. There is no evidence of any lymphadenopathy, and this would not explain the fact that this man has a raised haemoglobin, white cell count and platelet count.

B	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. There is no suggestion of a lymphocytosis in this man, or peripheral lymphadenopathy on examination.

C	Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. Chronic myeloid leukaemia would cause an increase in granulocytic precursors on the blood film which is not discussed here. The white cell count is usually very greatly elevated in chronic myeloid leukaemia, often greater than 100 or even 200 x 10^9/l.

E	Secondary polycythaemia

Secondary polycythaemia is incorrect. This man is not hypoxic, and the respiratory examination is normal, which suggests no underlying lung pathology. Splenomegaly and other evidence of myeloproliferation also point to primary rather than secondary polycythaemia.

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A 70-year-old woman with aortic stenosis complains of increasing shortness of breath associated with occasional chest pain. On examination she looks anaemic and has bilateral crepitations on auscultation. A late systolic murmur is heard at the cardiac base. Results of laboratory examination are:

Hb	7.4 g/l
Litre	MCV 70fL
Leukocytes	5.4×10^9/l
Platelets	580×10^9/litre

The blood smear shows hypochromic, microcytic erythrocytes.

Which one of the following is the most likely diagnosis?

A	Anaemia of chronic disease
B	Autoimmune haemolytic anaemia
C	Iron deficiency anaemia
D	Folate deficiency anaemia
E	Microangiopathic haemolytic anaemia

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A	Anaemia of chronic disease
B	Autoimmune haemolytic anaemia
C	Iron deficiency anaemia
D	Folate deficiency anaemia
E	Microangiopathic haemolytic anaemia

Explanation

C	Iron deficiency anaemia

This lady has a microcytic anaemia associated with a thrombocytosis. The anaemia is quite significant, and the microcytosis is quite pronounced, suggesting iron deficiency anaemia more than the anaemia of chronic disease.

A	Anaemia of chronic disease

Anaemia of chronic disease is incorrect. This is a significant anaemia with a significant microcytosis. In the anaemia of chronic disease, it is rare for the haemoglobin to be less than 8 gm/dl, and one would not expect such a significant microcytosis.

B	Autoimmune haemolytic anaemia

Auto-immune haemolytic anaemia is incorrect. Auto-immune haemolytic anaemia rarely causes microcytosis.

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Explanation

C	Iron deficiency anaemia

This lady has a microcytic anaemia associated with a thrombocytosis. The anaemia is quite significant, and the microcytosis is quite pronounced, suggesting iron deficiency anaemia more than the anaemia of chronic disease.

A	Anaemia of chronic disease

Anaemia of chronic disease is incorrect. This is a significant anaemia with a significant microcytosis. In the anaemia of chronic disease, it is rare for the haemoglobin to be less than 8 gm/dl, and one would not expect such a significant microcytosis.

B	Autoimmune haemolytic anaemia

Auto-immune haemolytic anaemia is incorrect. Auto-immune haemolytic anaemia rarely causes microcytosis.

D	Folate deficiency anaemia

Folate deficiency anaemia is incorrect. Folate deficiency anaemia would be expected to cause a macrocytosis not a microcytosis.

E	Microangiopathic haemolytic anaemia

Microangiopathic haemolytic anaemia is incorrect.
Microangiopathic haemolytic anaemia again would not cause such a significant microcytosis. In addition, microangiopathichaemolytic anaemias are often associated with a thrombocytopenia, but in this case the platelet count is raised.

41770

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A 52-year-old man with minimal change disease and nephrotic syndrome presents to the Emergency Department with acutely worsening shortness of breath. On examination his blood pressure (BP) is 100/60 mmHg, pulse 100 bpm regular. His respiratory rate is 38 breaths/min and auscultation of the chest reveals no signs of pulmonary oedema. He has gross swelling of his lower limbs consistent with his underlying renal disease.

Arterial blood gas measurement (air):

- $p_a(O_2)$ 6.6 kPa
- $p_a(CO_2)$ 3.8 kPa

Which underlying clotting disorder is most likely to be the cause of his presentation on this occasion?

A	Antiphospholipid antibody syndrome
B	Factor V Leiden mutation
C	Occult pelvic malignancy
D	Protein C deficiency
E	Protein S deficiency

46317

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E Protein S deficiency

Protein S deficiency has been described in the nephrotic syndrome. This is an acquired deficiency, due to loss of free protein S in the urine. This, along with the loss of anti-thrombin via the kidney, could contribute to the pro-thrombotic state.

D Protein C deficiency

Protein C deficiency is incorrect. Protein C deficiency is not well described in the nephrotic syndrome.

A Antiphospholipid antibody syndrome

Antiphospholipid antibody syndrome is incorrect. Antiphospholipid antibody syndrome is not associated with the risk of venous thrombosis in the nephrotic syndrome for similar reasons to factor V Leiden mutation.

B Factor V Leiden mutation

Factor V Leiden mutation is incorrect. Factor V Leiden mutation is not associated with an increased venous thrombotic risk in the nephrotic syndrome. This risk occurs because of loss of the natural anticoagulants as part of the proteinuria seen in the nephrotic syndrome, rather than this mutation in the factor V gene.

C Occult pelvic malignancy

Occult pelvic malignancy is incorrect. There is no suggestion of occult pelvic malignancy given in the question.

46317

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A 30-year-old man completed adjuvant chemotherapy for a stage-I testicular teratoma 1 month ago. He now presents with increasing shortness of breath and a dry cough. You suspect an adverse drug reaction related to one of his chemotherapeutic agents.

Which one of the following would be the most likely drug responsible?

A	Bleomycin
B	Cisplatin
C	Etoposide
D	Methotrexate
E	Vincristine

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Previous Question | Skip Question

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A	Bleomycin

Bleomycin can cause pulmonary toxicity, which typically occurs during or shortly after completing treatment. Classical symptoms are shortness of breath, dry cough and fever (particularly in the acute setting). It can result in permanent damage and pulmonary fibrosis.

B	Cisplatin

Cisplatin is incorrect. Cisplatin is used to treat testicular teratoma but does not cause pulmonary toxicity. Cisplatin is associated with peripheral sensory neuropathy.

C	Etoposide

Etoposide is incorrect. Etoposide is used to treat testicular teratoma but does not cause pulmonary toxicity.

D	Methotrexate

Methotrexate is incorrect. Although methotrexate can cause pulmonary fibrosis, it is rarely seen and is not used in the treatment of teratoma; it is more commonly associated with hepatotoxicity.

E	Vincristine

Vincristine is incorrect. Vincristine does not cause pulmonary toxicity – the common side-effects of this agent are sensory neuropathy and alopecia.

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A 55-year-old female presented with abdominal pain and frequency. She admits to symptoms of weight loss and night sweats. Examination demonstrated a splenic tip palpable 12 cm below the costal margin and mild hepatomegaly, but there was no clinical enlargement of the peripheral lymph nodes. The full blood count was haemoglobin 8.9 g/dl, white blood cell count 5.4×10^9 per litre, platelets 470×10^9 per litre, mean cell volume 85 femtolitre (fl) and reticulocytes 2.4%. The peripheral blood film was reported to show ovalocytes (elliptocytes) and the occasional myelocyte and nucleated red cell. The serum lactate dehydrogenase (LDH) was 1256 U/l.

Which one of the following is the most likely diagnosis?

A	Chronic myeloid leukaemia
B	Essential thrombocythaemia
C	Megaloblastic anaemia
D	Myelofibrosis
E	Non-Hodgkin's lymphoma

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Previous Question Skip Question

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D	Myelofibrosis

This middle-aged lady has very significant splenomegalywith mild hepatomegaly. There is evidence of a normochromic anaemia, and most importantly a white cell count that is not particularly raised. The peripheral blood film shows early white blood cell and red blood cell precursors. This description is known as a leucoerythroblastic blood picture. The significantly enlarged spleen in the presence of a normal white cell count strongly suggests myelofibrosis.

C	Megaloblastic anaemia

Megaloblastic anaemia is incorrect. The mean cell volume (MCV) is normal at 85.

A	Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. This is the other differential diagnosis for a significantly enlarged spleen, and in contrast to myelofibrosis, the white cell count is usually very elevated, and can be greater than 200 × 10^9/l.

B	Essential thrombocythaemia

Essential thrombocythaemia (ET) is incorrect. This is a myeloproliferative disorder that results in a high platelet count. This would not be expected to cause such significant splenomegaly,and the blood film findings in ET do not show a leucoerythroblastic blood picture as described here.

E	Non-Hodgkin's lymphoma

Non-Hodgkin's lymphoma is incorrect. This could be a cause of hepatosplenomegaly, but there is no peripheral lymphadenopathy. Although there can be a leucoerythroblastic blood picture if there is bone marrow invasion by non-Hodgkin's lymphoma, the clinical

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Syndrome of inappropriate antidiuretic hormone secretion (SIADH) is most commonly associated with which tumour type?

A	Bronchial carcinoid tumour
B	Pancreatic cancer
C	Prostate cancer
D	Small-cell carcinoma of the lung
E	Squamous-cell carcinoma of the lung

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Previous Question | Skip Question

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Syndrome of inappropriate antidiuretic hormone secretion (SIADH) is most commonly associated with which tumour type?

Your answer was correct

A	Bronchial carcinoid tumour
B	Pancreatic cancer
C	Prostate cancer
D	Small-cell carcinoma of the lung
E	Squamous-cell carcinoma of the lung

Explanation

D	Small-cell carcinoma of the lung

SIADH is characterised by the abnormal release of ADH resulting in impaired water excretion with normal sodium excretion, which in turn leads to hyponatraemia and low plasma osmolality relative to urine osmolality. The most common malignant cause is small-cell lung cancer, but SIADH is also seen in carcinoid syndrome, pancreatic cancer, prostate cancer, lymphoma and leukaemia. It can also be caused by drugs (high-dose cyclophosphamide, vincristine), intracranial lesions and infections. Clinically it causes headaches, weakness, confusion, drowsiness and seizures.

A	Bronchial carcinoid tumour

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Bronchial carcinoid tumour is incorrect. Bronchial carcinoid

osama Sadig's screen

A 60-year-old woman, who has been a life-long smoker, has been recently diagnosed with lung cancer. Her husband asks you about how her smoking is likely to have contributed to her chances of developing this condition.

Which one of the following best describes the contribution of smoking history to lung cancer risk?

A	Life-long smokers are particularly likely to develop adenocarcinoma compared with life-long non-smokers
B	Life-long smokers have a 50% increased risk of developing cancer compared with non-smokers
C	Life-long smokers have a lung cancer risk 2–3 times greater than that of non-smokers
D	Non-smokers are more likely to develop small-cell cancers
E	The relative risk for developing small-cell lung cancer and squamous-cell lung cancer is increased in smokers

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Previous Question | Skip Question

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Explanation

E	The relative risk for developing small-cell lung cancer and squamous-cell lung cancer is increased in smokers

Lung cancer is the most common cancer in the world. The relative risk is greater for squamous-cell and small-cell lung cancers than for adenocarcinomas. In non-smokers with lung cancer, adenocarcinoma is the most frequently observed histological type.

A	Life-long smokers are particularly likely to develop adenocarcinoma compared with life-long non-smokers

Life-long smokers are particularly likely to develop adenocarcinoma compared with life-long non-smokers is incorrect. The relative risk is greater for squamous-cell and small-cell lung cancers than for adenocarcinomas.

B	Life-long smokers have a 50% increased risk of developing cancer compared with non-smokers

Life-long smokers have a 50% increased risk of developing cancer compared with non-smokers is incorrect. The relative risk is 2000–3000% greater.

C	Life-long smokers have a lung cancer risk 2–3 times greater than that of non-smokers

Life-long smokers have a lung cancer risk 2–3 times greater than that of non-smokers is incorrect. Life-long smokers have a lung-cancer risk 20–30 times greater than that of a non-smoker.

D	Non-smokers are more likely to develop small-cell cancers

Non-smokers are more likely to develop small-cell cancers is incorre oking increases the risk of all histological types of lung cancer ling small-cell lung cancer.

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A 49-year-old woman undergoes a mastectomy for an invasive ductal carcinoma of the breast. The doctors in the unit where she is managed are interested in utilising tumour markers to monitor for possible recurrence of her disease, in addition to radiological and clinical surveillance.

Which one of the following markers has potential utility in monitoring breast cancer?

A	Acid phosphatase
B	CA 15-3
C	CA 19-9
D	CA 125
E	HCG

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Explanation

B	CA 15-3

CA 15-3 is a tumour marker associated with breast cancer and as such can be used as a general indicator of tumour burden and possible metastasis, although it is not specific to neoplastic disease and may show low level elevations in benign breast disease or hepatic cirrhosis. Additionally, small elevations in CA 15-3 may be seen in hepatic or pancreatic cancers. CA15-3 is not sufficiently sensitive to be used as a diagnostic marker for breast cancer, as up to 30% of tumours will not be associated with a rise in the marker.

A	Acid phosphatase

Acid phosphatase is incorrect. Acid phosphatase was used historically to monitor prostatic carcinoma before the advent of PSA measurement.

C	CA 19-9

CA 19-9 is incorrect. CA 19-9 is a tumour marker used in the monitoring of pancreatic cancer.

D	CA 125

CA 125 is incorrect. CA 125 is an ovarian tumour marker.

E	HCG

HCG is incorrect. HCG may be a useful marker in monitoring germ-cell tumours.

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A 32-year-old woman presents with painless cervical lymphadenopathy which has been present for 4 months. Biopsy shows Hodgkin's disease. She is further investigated with CT scanning of her chest and abdomen and bone marrow biopsy.

Which one of the following clinical or histological features would most indicate a favourable prognosis, taking into account either clinical features or the bone marrow examination?

A	Bone marrow involvement
B	Cervical, mediastinal and infradiaphragmatic lymphadenopathy
C	Lymphocyte-depleted type histology
D	Lymphocyte-predominant histology
E	Weight loss and Pel-Ebstein fever

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Which one of the following clinical or histological features would most indicate a favourable prognosis, taking into account either clinical features or the bone marrow examination?

Your answer was correct

A	Bone marrow involvement
B	Cervical, mediastinal and infradiaphragmatic lymphadenopathy
C	Lymphocyte-depleted type histology
D	Lymphocyte-predominant histology
E	Weight loss and Pel-Ebstein fever

Explanation

D	Lymphocyte-predominant histology

Hodgkin's lymphoma is classified by the World Health Organisation (WHO) into two main entities. The first entity is nodular lymphocyte predominant Hodgkin's lymphoma, which has a good overall prognosis. The second type is classical Hodgkin's lymphoma. This has been divided into four histological sub-types – nodular sclerosis Hodgkin's disease, mixed cellularity Hodgkin's disease, lymphocyte-rich Hodgkin's disease and lymphocyte-depleted classical Hodgkin's disease.Lymphocyte predominant histology therefore would most indicate a favourable prognosis in this question.

A	Bone marrow involvement

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Bone marrow involvement is incorrect. Bone marrow involvement

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Explanation

D	Lymphocyte-predominant histology

Hodgkin's lymphoma is classified by the World Health Organisation (WHO) into two main entities. The first entity is nodular lymphocyte predominant Hodgkin's lymphoma, which has a good overall prognosis. The second type is classical Hodgkin's lymphoma. This has been divided into four histological sub-types – nodular sclerosis Hodgkin's disease, mixed cellularity Hodgkin's disease, lymphocyte-rich Hodgkin's disease and lymphocyte-depleted classical Hodgkin's disease.Lymphocyte predominant histology therefore would most indicate a favourable prognosis in this question.

A	Bone marrow involvement

Bone marrow involvement is incorrect. Bone marrow involvement indicates widespread stage IV involvement, which would indicate a less favourable prognosis.

B	Cervical, mediastinal and infradiaphragmatic lymphadenopathy

Cervical, mediastinal and infradiaphragmatic lymphadenopathy is incorrect. Cervical, mediastinal and infradiaphragmatic lymphadenopathy would indicate more widespread disease, which would indicate a less favourable prognosis than localised disease.

C	Lymphocyte-depleted type histology

Lymphocyte-depleted type histology is incorrect. Lymphocyte-depleted histology, as one can see from the above classification, is a form of classical Hodgkin's lymphoma. The lymphocyte-predominant histology would give a more favourable prognosis.

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A 22-year-old woman is referred by her GP to the Haematology Clinic. She has been feeling increasingly lethargic over the past few weeks, and visited her family doctor because she noticed an enlarged lymph node on the left-hand side of her neck. She has no past medical history of note and takes no regular medication. On examination her BP is 105/80 mmHg, pulse is 80/min and regular. She has an enlarged left supraclavicular lymph node. There are no other abnormal findings, her BMI is 23. Investigations:

Hb	10.5 g/dl
WCC	9.8 $x10^9$/l
PLT	155 $x10^9$/l
Na^+	137 mmol/l
K^+	4.5 mmol/l
Creatinine	90 micromol/l
ESR	72 mm/1st hour
CXR	evidence of mediastinal lymph node enlargement

Which of the following is the most likely diagnosis?

A	Hodgkin's lymphoma
B	Infectious mononucleosis
C	Sarcoidosis
D	Toxoplasmosis

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A	Hodgkin's lymphoma

This lady has an enlarged left supraclavicular lymph node, as well as evidence of mediastinal lymph node enlargement on the chest X-ray. This is typical of Hodgkin's disease. An excision lymph node biopsy is the method of choice with respect to confirming the diagnosis.

B	Infectious mononucleosis

Infectious mononucleosis is incorrect. Infectious mononucleosis is unlikely in the absence of pharyngitis, and would be less likely to give mediastinal lymph node enlargement on the chest X-ray.

C	Sarcoidosis

Sarcoidosis is incorrect. Sarcoidosis can be associated with hilar lymphadenopathy, although it would not be expected to lead to anaemia.

D	Toxoplasmosis

Toxoplasmosis is incorrect. Toxoplasmosis is usually asymptomatic in more than 90% of cases.

E	Tuberculosis

Tuberculosis is incorrect. There are no particular risk factors for tuberculosis in this young lady, and Hodgkin's disease would be a more likely diagnosis given the clinical findings described.

4732

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A 60-year-old gentleman presented 18 years ago with polycythaemiarubravera. The full blood count then was haemoglobin 20 g/l, white cells 4.5 × 10^9/l and platelets 586 × 10^9/l. He was treated with two doses of P32. Five years ago the polycythaemia indices recurred. The blood count was controlled with daily hydroxyurea. Two months ago hydroxyurea was discontinued as it was noticed that the patient became anaemic and thrombocytopaenic. Despite discontinuing the hydroxyurea, the patient became increasingly thrombocytopaenic and transfusion dependent.

Which one of the following best describes the patient's condition?

A	Development of ITP
B	Development of myelofibrosis
C	Hydroxyurea-related myelosuppression
D	Progression of myelodysplasia
E	Transformation to acute leukaemia

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B	Development of myelofibrosis

Development of myelofibrosis is the most likely cause for why this patient has become anaemic and thrombocytopaenic despite the fact that hydroxycarbamide has been discontinued. Transition from primary polycythaemia to myelofibrosis occurs in about 30%of patients.

A	Development of ITP

Development of ITP is incorrect. We are told that in addition to becoming thrombocytopaenic, thepatient has also become anaemic.

C	Hydroxyurea-related myelosuppression

Hydroxyurea-related myelosuppression is incorrect. Hydroxyurea-related myelosuppression is false, because this man has been off this medication for over 2 months and, despite this, the patient's blood counts have continued to fall.

D	Progression of myelodysplasia

Progression of myelodysplasia is incorrect. Generally, primary polycythaemia does not change to myelodysplasia.

E	Transformation to acute leukaemia

Transformation to acute leukaemia is incorrect. Transformation to acute leukaemia can occur, particularly if patients have been exposed to radioactive phosphorous treatment or busulfan therapy. Only about 5% of patients with polycythaemia progress to acute leukae l, therefore, the probability of developing myelof the correct answer, is higher and thus more likely.

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A 45-year-old woman with known metastatic breast cancer presents with fatigue, nausea and constipation. Routine blood tests reveal a calcium level of 3.2 mmol/l (2.2–2.6) with a normal albumin level.

How would she be most appropriately treated?

A	Corticosteroids, intravenous hydration with normal saline and furosemide
B	Intravenous hydration with normal saline
C	Intravenous hydration with normal saline and oral bisphosphonate
D	Intravenous hydration with normal saline and subcutaneous calcitonin
E	Intravenous hydration with normal saline followed by intravenous bisphosphonate if the calcium remains elevated

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Explanation

E	Intravenous hydration with normal saline followed by intravenous bisphosphonate if the calcium remains elevated

Malignant hypercalcaemia is a common sequalae of metastatic cancer. Osteolytic metastases and paraneoplastic syndromes are the most frequent causes of malignant hypercalcaemia. Mild hypercalcaemia (<3.0 mmol/l) may be treated expectantly with increased oral hydration, withholding thiazide diuretics, and appropriately treating the malignancy. Severe hypercalcaemia (>3.0 mmol/l) requires intravenous rehydration and administration of intravenous bisphosphonate post rehydration, typically zolendronic acid. Furosemide may be used as an adjunct to increase urinary calcium excretion once the patient is fully hydrated.

B	Intravenous hydration with normal saline

Intravenous hydration with normal saline is incorrect as it is only part of the appropriate management.

A	Corticosteroids, intravenous hydration with normal saline and furosemide

Corticosteroids, intravenous hydration with normal saline and furosemide is incorrect. Corticosteroids can sometimes be used in addition, but only if the underlying tumour is steroid responsive, eg a myeloma or lymphoma.

C	Intravenous hydration with normal saline and oral bisphosphonate

Intravenous hydration with normal saline and oral bisphosphonate is incorrect. Oral bisphosphonates have a low bioavailability and therefore not recommended in the acute setting.

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D	Intravenous hydration with normal saline and

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5

Reptilase time (RT) is a blood test used to detect deficiency or abnormalities in fibrinogen,[1][2] especially in cases of heparin contamination.

Reptilase, an enzyme found in the venom of Bothrops snakes, has activity similar to thrombin. Unlike thrombin, reptilase is resistant to inhibition by antithrombin III. Thus, the reptilase time is not prolonged in blood samples containing heparin, hirudin, or direct thrombin inhibitors, whereas the thrombin time will be prolonged in these samples. Reptilase also differs from thrombin by releasing fibrinopeptide A, but not fibrinopeptide B, in its cleavage of fibrinogen.

Other causes of prolonged reptilase time include the presence of fibrin degradation products, which interfere with fibrin polymerization.

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You are asked to provide advice on a 35-year-old woman who is admitted under the maxillofacial surgeons for the extraction of wisdom teeth. The only concern was that she had developed prolonged bleeding after a tooth extraction 10 years previously and had required suturing. Besides this, she gave no other history of bleeding.

What is the most likely diagnosis?

A	Factor IX deficiency
B	Factor V Leiden
C	Factor XII deficiency
D	Primary antiphospholipid syndrome
E	von Willebrand's disease

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Explanation

E	von Willebrand's disease

This lady had prolonged bleeding after a previous dental extraction. Von Willebrand's disease can affect both men and women as it is inherited in an autosomal-dominant manner. This typically causes menorrhagia, nose bleeds and post-operative bleeding, as well as excessive bleeding following dental extractions.

A	Factor IX deficiency

Factor IX deficiency is incorrect. Factor IX deficiency results in haemophilia B. Inheritance here is X-linked, and therefore this condition only affects males. The question refers to a 35-year-old woman. Moreover, haemophilia B results in bleeding into joints and muscles, which is not the case in this question.

B	Factor V Leiden

Factor V Leiden is incorrect. Factor V Leiden is the most common cause of inherited thrombophilia. It results in increased blood clotting not excessive bleeding.

C	Factor XII deficiency

Factor XII deficiency is incorrect. Factor XII deficiency does not result in clinical bleeding, but can result in prolongation of the APTT.

D	Primary antiphospholipid syndrome

Primary antiphospholipid syndrome is incorrect. Primary anti-phospholipid antibody syndrome causes venous and arterial thrombi, not excessive bleeding.

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A 20-year-old man of Italian origin presents with a 3-day history of pallor and dark urine. He has had an upper respiratory tract infection and has been on antibiotics. On examination, apart from pallor and jaundice, there is nothing to find. Investigations:

Hb	4.9 g/dll (13-18)
MCV	104 fl (80-96)
MCH	27 pg (28–32)
MCHC	36 g/dl (32–35)
WCC	6.7 × 109/l (4–11 × 10^9) with a normal differential
Platelets	380 × 109/l (150–400 × 10^9)
Reticulocytes	238 × 109/l (50–100 × 10^9)
Urea	3.5 mmol/l (2.5–7.5)
Na^+	135 mmol/l (137–144)
K^+	4.6 mmol/l (3.5–4.9)
Creatinine	89 µmol/l (60–110)
AST	27 U/l (1–31)
ALT	43 U/l (5–35)
ALP	98 U/l (45–105)
Bilirubin	75 µmol/l (1–22)
LDH	1324 U/l (10–250)
Blood film	Shows blister and bite cells

Which one of the following is the most likely diagnosis?

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MCV	104 fl (80-96)
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LDH	1324 U/l (10-250)
Blood film	Shows blister and bite cells

Which one of the following is the most likely diagnosis?

A	Aplastic anaemia
B	Autoimmune haemolytic anaemia
C	Glucose 6-phosphate dehydrogenase deficiency
D	Hepatitis B

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C Glucose 6-phosphate dehydrogenase deficiency

It sounds as if this man has had a short history of producing dark urine as a result of an upper respiratory tractinfection for which he has been treated with antibiotics. His bilirubin is raised, but the rest of his liver function tests are normal. His LDH level is significantly raised, and these two features suggest haemolytic problems. The reticulocyte count is also raised, suggesting haemolysis. The fact that there are blister and bite cells on the blood film again is very suggestive of G6PD deficiency. He also has the appropriate ethnic background. This is an episodic form of an inherited haemolytic anaemic condition. The trigger here may well have been his recent upper respiratory tract infection.

A Aplastic anaemia

Aplastic anaemia is incorrect. This would not cause the haemolytic parameters as above. It would also result in a pancytopenic condition, but the white cell count is normal here with anormal differential. The platelet count is also normal.

B Autoimmune haemolytic anaemia

Auto-immune haemolytic anaemia is incorrect. This could cause the abnormal haemolytic parameters, but the blood film would not show blister and bite cells in idiopathic auto-immunehaemolytic anaemia. This diagnosis also would not tie in with this young man's Italian background.

D Hepatitis B

Hepatitis B is incorrect. This would usually cause a raised AST and ALT. The AST here is normal, with only a very marginally raised ALT level.

E Hereditary spherocytosis

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A 40-year-old man is referred because he was rejected as a blood donor. He has no medical history of note. There is a vague family history of anaemia, in that he thinks that his older brother, with whom he has lost touch, was investigated for anaemia. On examination he is clinically anaemic. On investigation

Hb	9.2 g/dl (13-18)
MCV	69 fl (80-96)
MCH	24 pg (28-32)
MCHC	29 g/dl (32-35)
WCC	6.9 x 109/l (4-11 x 10^9)with a normal differential
Platelets	195 x 109/l (150-400 x 10^9)
Urea and electrolytes and liver function tests	Normal
Serum iron	45 µmol/l (14-29)
Total iron-binding capacity (TIBC)	64 µmol/l (45-72)
Ferritin	515 µg/l (15-200)
Bone marrow aspirate	Shows abnormal erythropoiesis, and increased iron in the stores and erythroid series

Which one of the following is the most likely diagnosis?

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myeloid leukaemia

B Anaemia of chronic disease

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Hb	9.2 g/dl (13–18)
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Ferritin	515 µg/l (15–200)
Bone marrow aspirate	Shows abnormal erythropoiesis, and increased iron in the stores and erythroid series

Which one of the following is the most likely diagnosis?

A	Acute myeloid leukaemia
B	Anaemia of chronic disease
C	Haemochromatosis
D	Myelodysplastic syndrome
E	Sideroblastic anaemia

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E	Sideroblastic anaemia

This man has a microcytic anaemia, with a raised serum ferritin. The bone marrow shows increased iron stores, in the erythroid series. In sideroblastic anaemia, the erythroblasts contain abnormal iron granules in the mitochondria, which are positioned around the nucleus – hence they are known as 'ringed sideroblasts'. Sideroblastic anaemia is classified into hereditary and acquired forms. Hereditary forms result in a defect in haem synthesis. Acquired forms include myelodysplasia, and in particular there is a form of myelodysplasia termed refractory anaemia with ringed sideroblasts.

A	Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. Acute myeloid leukaemia is certainly false. This would usually cause an abnormal white blood cell differential (including blasts in the blood) and thrombocytopenia in addition.

B	Anaemia of chronic disease

Anaemia of chronic disease is incorrect. We are told that this man has no other medical history of note, and again this does not tie in with the possible hereditary aspect to this question. The anaemia of chronic disease would often be associated with a reactive thrombocytosis, and such a profound microcytosis would not be expected in the anaemia of chronic disease.

C	Haemochromatosis

Haemochromatosis is incorrect. This does not cause a significant anaemia.Also, it would not be associated with abnormal erythropoiesis.

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D	Myelodysplastic syndrome

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sideroblasts.

A	Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. Acute myeloid leukaemia is certainly false. This would usually cause an abnormal white blood cell differential (including blasts in the blood) and thrombocytopenia in addition.

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Anaemia of chronic disease is incorrect. We are told that this man has no other medical history of note, and again this does not tie in with the possible hereditary aspect to this question. The anaemia of chronic disease would often be associated with a reactive thrombocytosis, and such a profound microcytosis would not be expected in the anaemia of chronic disease.

C	Haemochromatosis

Haemochromatosis is incorrect. This does not cause a significant anaemia.Also, it would not be associated with abnormal erythropoiesis.

D	Myelodysplastic syndrome

Myelodysplastic syndrome is incorrect. Myelodysplastic syndrome is an important differential. Usually, however, this only occurs in patients who are older. The fact that the history says that there is a possible hereditary component to this question would not lead towards myelodysplastic syndrome. It usually causes a normocytic or macrocytic anaemia. It can be associated with an abnormal white blood cell differential (eg neutropenia), which is not the case here. It can also be associated with thrombocytopenia, which again is not found here.

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A 72-year-old man presents to the Emergency medical take with severe headaches, which have been increasing over the past few months. He has a history of hypertension, for which he takes three oral agents, and a previous inferior myocardial infarction. Examination reveals a plethoric, ruddy facial appearance. His BP is 155/82 mmHg, pulse is 85/min and regular. He has splenomegaly on palpation of his abdomen.

Investigations:

Hb	18.8 g/dl
WCC	8.1 x 10^9/l
PLT	510 x 10^9/l
Na^+	138 mmol/l
K^+	4.4 mmol/l
Creatinine	122 micromol/l
Serum EPO	Level is below the normal range

The presence of which of the following would confirm the diagnosis of primary polycythaemia?

A	JAK2 617 V F or a functionally similar mutation
B	Leucocyte alkaline phosphatase >100 units
C	O_2 saturation >92%
D	Platelet count of 510 x 10^9/l
E	Serum iron in the normal range

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A	JAK2 617 V F or a functionally similar mutation

A mutation in the JAK2 gene would confirm the diagnosis of primary polycythaemia. This is found in greater than 95% of patients with primary polycythaemia. This is a simple test that can be done on a sample of peripheral blood and has greatly simplified the diagnosis of primary polycythaemia.

B	Leucocyte alkaline phosphatase >100 units

Leucocyte alkaline phosphatase >100 units is incorrect. Leukocyte alkaline phosphatase is not done any longer and is an out-of-date test.

C	O_2 saturation >92%

O_2 saturation >92% is incorrect. Oxygen saturations greater than 92% would demonstrate that this man is nothypoxic, and would be against a diagnosis of secondary polycythaemia, but in itself does not confirm the diagnosis of primary polycythaemia.

D	Platelet count of $510 \times 10^9/l$

Platelet count of $510 \times 10^9/l$ is incorrect. Having a platelet count of 510 does not confirm the diagnosis of primary polycythaemia. It does add more weight to the myeloproliferative nature of this man's polycythaemia, but in its own right is not diagnostic.

E	Serum iron in the normal range

Serum iron in the normal range is incorrect. Serum iron in th normal range does not help. This does not confirm the diagnosis of primary polycythaemia.

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A 52-year-old man is referred to the Haematology Clinic after a routine FBC showed a WCC of 6 × 10^3/mm^3, Hb 18.4 g/dl and platelets 142 × 10^3/mm^3. He smokes and has hypertension that is controlled by atenolol. He was admitted 2 years ago with a pulmonary embolism after a transatlantic flight, at which time his blood gases showed $p(O_2)$ of 6.6 kPa, $p(CO_2)$ 3.2 kPa, pH 7.53, O_2 saturation 98%. His FBC results at the time were WCC 9.9 × 10^3/mm^3, Hb 17.9 g/dl, platelets 198 × 10^3/mm^3. Clinical examination reveals a normal cardiovascular and respiratory system, with a respiratory rate 12 breaths per minute and BP 121/74 mmHg.

Which one of the following is the most likely cause of his polycythaemia?

A	Polycythaemia rubravera (PRV)
B	Chronic pulmonary vascular disease
C	'Stress' polycythaemia
D	Increased-affinity haemoglobin
E	Chronic obstructive airways disease

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D	Increased-affinity haemoglobin

This man has polycythaemia. It could be primary polycythaemia, secondary polycythaemia or apparent polycythaemia. Increased-affinity haemoglobin is the correct answer. This shows that when he was hypoxic, he had oxygen saturations of 98%. This implies that the affinity of his haemoglobin for oxygen is high, ie even at a low $p(O_2)$, his haemoglobin is reluctant to give up oxygen to the tissues. This therefore renders them hypoxic and drives an increase in red blood cell production.

E	Chronic obstructive airways disease

Chronic obstructive airways disease is incorrect - because it would not explain the normal oxygen saturation in the presence of a low $p(O_2)$ and clinical examination reveals a normal respiratory system.

A	Polycythaemia rubravera (PRV)

Polycythaemia rubra vera is incorrect. Polycythaemia rubra vera would not explain the abnormal blood gases, and there are no other features to suggest this myeloproliferative disorder, such as a raised white cell count, or splenomegaly.

B	Chronic pulmonary vascular disease

Chronic pulmonary vascular disease is incorrect. Once again, a lower O_2 saturation would be expected.

C	'Stress' polycythaemia

Stress polycythaemia is incorrect. Stress polycythaemia also known as apparent polycythaemia, is a possibility, but again it does not explain the abnormal arterial blood gases.

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A 22-year-old woman comes to the Gastroenterology Clinic. She has had coeliac disease diagnosed some 5 years ago, and has difficulty controlling her symptoms. She opens her bowels some 3–4 times per day and complains of intermittent abdominal bloating. There is no other significant past medical history and her only medication is the combined oral contraceptive pill. Examination reveals a BP of 95/50 mmHg, pulse is 70/min and regular. Her abdomen is soft and non-tender; her BMI is reduced at 19.5. Investigations:

Hb	9.1 g/dl
Blood film	Howell-Jolly bodies seen on film
WCC	7.1 x 10^9/l
PLT	157 x 10^9/l
Na^+	137 mmol/l
K^+	4.3 mmol/l
Creatinine	102 micromol/l
Albumin	29 g/l
ALT	54 U/l
Glucose	5.1 mmol/l

Which of the following infections is she shown to be at increased risk of?

A	Herpes simplex
B	Influenza
C	Pneumococcus

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difficulty controlling her symptoms. She opens her bowels some 3–4 times per day and complains of intermittent abdominal bloating. There is no other significant past medical history and her only medication is the combined oral contraceptive pill. Examination reveals a BP of 95/50 mmHg, pulse is 70/min and regular. Her abdomen is soft and non-tender; her BMI is reduced at 19.5. Investigations:

Hb	9.1 g/dl
Blood film	Howell-Jolly bodies seen on film
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Which of the following infections is she shown to be at increased risk of?

A	Herpes simplex
B	Influenza
C	Pneumococcus
D	Pseudomonas
E	Tuberculosis

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Explanation

C Pneumococcus

This lady will be at risk of pneumococcal infection. She has coeliac disease, which is associated with hyposplenism. Howell-Jolly bodies are seen on the blood film which is a characteristic blood film finding in patients with hyposplenism. Hyposplenism is associated with increased risk of infection, particularly from encapsulated bacteria such as pneumococcus and meningococcus.

A Herpes simplex

Herpes simplex is incorrect. Herpes simplex is not a characteristic infection that patients with hyposplenism are at risk of.

B Influenza

Influenza is incorrect. Influenza is not a characteristic infection that patients with hyposplenism are at risk of.

D Pseudomonas

Pseudomonas is incorrect. Patients with hypersplenism are not at risk of increased pseudomonas infections.

E Tuberculosis

Tuberculosis is incorrect. Patients with hyposplenism do not have an increased risk of tuberculosis.

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A general practitioner calls you for advice about a 28-year-old woman with easy bruising. She has previously attended a psychiatric unit for self-harming behaviour. She is generally well, apart from occasional diarrhoea, and has no mucosal bleeding. Her mother has had recurrent venous thromboses, but there is no family history of a bleeding disorder. A full blood count is normal, but her coagulation screen is abnormal: activated partial thromboplastin time (APTT) 60 s (normal 28–38 s), prothrombin time (PT) no clot after 120 s (normal 10–14s) and fibrinogen 3.6 g/l (normal 2–4 g/l).

Which one of the following is the most likely explanation?

A	Incorrect sampling
B	Inherited dysfibrinogenaemia
C	Inherited factor VII deficiency
D	Vitamin K deficiency caused by malabsorption
E	Warfarin overdose

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E	Warfarin overdose

This lady has a psychiatric history, and we are told that her mother has recurrent venous thrombosis. The prothrombin time shows no clot after 120 s, meaning that the INR will be very prolonged. The APTT is a little prolonged, but not as much. The fibrinogen level is normal. This is therefore consistent with this young lady taking her mother's warfarin, that she in turn takes for recurrent venous thrombosis. The important point to note is that warfarin over anticoagulation does not just increase the INR, but can increase the APTT as well.

C	Inherited factor VII deficiency

Inherited factor VII deficiency is incorrect. This has not come to light in 28 years of this woman's life. Factor VII deficiency can lead to a prolonged prothrombin time. However, it really is very prolonged on this occasion, and one would expect clinical symptoms to have occurred many years before this, because one would expect a severe factor VII deficiency if the prothrombin time was so prolonged.

A	Incorrect sampling

Incorrect sampling is incorrect. With symptoms of easy bruising, it would be very unlikely that incorrect sampling would lead to such grossly prolonged clotting times.

B	Inherited dysfibrinogenaemia

Inherited dysfibrinogenaemia is incorrect. As the fibrin is needed to form a clot, all coagulation time would be prolonged. This would also not fit in with the history that is given about the fact that she has a psychiatric history, and that her mother is likely to be anticoagulants for recurrent thrombotic events.

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A 72-year-old man is referred to the clinic with increasing tiredness and dull abdominal pain. He has a past history of hypertension and an inferior myocardial infarction, but nil else of note. On examination he looks pale. His BP is 135/72 mmHg, pulse is 90/min and regular. He has evidence of gross splenomegaly and a distended abdomen. Investigations:

Hb	100 g/l
WCC	6.0 x 10^9/l
PLT	150 x 10^9/l

Blood film reveals a leukoerythroblastic picture with tear drop cells

Which of the following is the most likely diagnosis?

A	Chronic lymphocytic leukaemia
B	Hodgkin's lymphoma
C	Myelodysplasia
D	Myelofibrosis
E	Non-Hodgkin's lymphoma

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D	Myelofibrosis

Myelofibrosis is the correct answer. There are only two major causes of gross splenomegaly.These are chronic myeloid leukaemia (CML) and myelofibrosis. To distinguish these two conditions, it is necessary to look at the white cell count. In CML, the white cell count is usually significantly raised, often greater than 100 $\times 10^9$/l or even higher. In contrast, the white cell count in myelofibrosis can sometimes be slightly raised, but is more often normal or even reduced. In terms of the other blood film findings, a leucoerythroblastic blood picture with teardrop cells is entirely typical of the diagnosis of myelofibrosis.

A	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. This man's white cell count is normal and we are not told that he has a lymphocytosis in his peripheral blood. This does not usually give rise to gross splenomegaly.

B	Hodgkin's lymphoma

Hodgkin's lymphoma is incorrect. Hodgkin's lymphoma usually gives rise to painless lymphadenopathy, usually above the diaphragm. Again, anaemia is rare, and gross splenomegaly is not seen.

C	Myelodysplasia

Myelodysplasia is incorrect. Myelodysplasia often results in anaemia with other cytopaenias. It does not give rise to gross splenomegaly.

E	Non-Hodgkin's lymphoma

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Non-Hodgkin's lymphoma is incorrect. Non-Hodgkin's lymphoma

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A 42-year-old lady, with known von Willebrand disease, is awaiting a dental extraction. A previous tooth extraction was complicated by profuse bleeding, and required a two-unit blood transfusion. Apart from menorrhagia and easy bruising when shehas been involved in contact sports, she has had no other particular problems.

What is the most appropriate prophylactic measure to use prior to the planned dental procedure?

A	Cryoprecipitate
B	DDAVP
C	FFP
D	Human cleansed factor VIII
E	Recombinant factor VIII

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A 42-year-old lady, with known von Willebrand disease, is awaiting a dental extraction. A previous tooth extraction was complicated by profuse bleeding, and required a two-unit blood transfusion. Apart from menorrhagia and easy bruising when shehas been involved in contact sports, she has had no other particular problems.

What is the most appropriate prophylactic measure to use prior to the planned dental procedure?

Your answer was correct

A	Cryoprecipitate
B	DDAVP
C	FFP
D	Human cleansed factor VIII
E	Recombinant factor VIII

Explanation

B	DDAVP

DDAVP enhances the release of pre-formed Von Willebrand factor and factor VIII, and is appropriate for such procedures such as a dental extraction. It is often combinedwith tranexamic acid.

A	Cryoprecipitate

Cryoprecipitate is incorrect. Cryoprecipitate is used to replace

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You are asked to review a patient with metastatic lung cancer who has a potassium level of 6.5 mmol/l. He has been receiving palliative therapy only for pain and symptom control and was relatively well until a few weeks ago, although he has recently complained of tiredness and malaise. His BP is a little low at 100/60 mmHg, his creatinine is towards the upper limit of the normal range. He is currently on no medication. A repeat measurement shows his potassium level to be 6.6 mmol/l.

Which one of the following might be the cause of his hyperkalaemia?

A	Bilateral adrenal metastases
B	Bilateral ureteric obstruction
C	Haemolysed blood sample
D	Septicaemia
E	Tumour-lysis syndrome

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Previous Question | Skip Question

Calculator

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Explanation

A	Bilateral adrenal metastases

The adrenal glands are the fourth most common site of metastasis after the lungs, liver and bone. The most common primary sites are lung, breast, skin (melanoma), kidney, thyroid and colon. Adrenal metastases may be unilateral or bilateral and the tumours vary in size. Most often, the lesions are clinically silent, but hypoadrenalism does occasionally occur, as described in this case.Features typically include abdominal pains, vomiting, muscular weakness, fatigue, hypotension, hyponatraemia and hyperkalaemia.

B	Bilateral ureteric obstruction

Bilateral ureteric obstruction is incorrect. Bilateral ureteric obstruction can lead to hyperkalaemia by causing renal failure, but renal function is normal in this case.

C	Haemolysed blood sample

Haemolysed blood sample is incorrect. The fact that a repeat blood sample also shows hyperkalaemia makes haemolysis of the blood sample unlikely.

D	Septicaemia

Septicaemia is incorrect. Septicaemia can lead to hyperkalaemia by causing renal failure, but renal function is normal in this case.

E	Tumour-lysis syndrome

Tumour-lysis syndrome is incorrect. Tumour-lysis syndrome is another cause of hyperkalaemia but is unlikely in a patient not receiving cytotoxic chemotherapy.

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A patient has been diagnosed with papillary carcinoma of the thyroid. He also has a solitary cervical lymph node. His thyroid function tests are normal.

Which one of the following is the most appropriate therapy?

A	Chemotherapy
B	Palliative care
C	Radiotherapy
D	Removal of lymph node
E	Total thyroidectomy and lymph node dissection

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Previous Question | Skip Question

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7:31

Explanation

E	Total thyroidectomy and lymph node dissection

Papillary thyroid cancer is the most common thyroid tumour, accounting for 80% of lesions. Distant metastases are uncommon and the overall cure rate is very high (approaching 100%) with a combination of surgery and radio-iodine ablation.

A total or near-total thyroidectomy should be performed because papillary carcinomas are often bilateral, and removal of thyroid tissue facilitates subsequent ablation by radio-iodine. There is controversy regarding surgery for low-risk unifocal papillary carcinomas (those less than 5 cm in diameter, especially in young patients), but bilateral resection is associated with a lower rate of local recurrence than unilateral total lobectomy. In papillary carcinoma, the ipsilateral central lymph nodes should be dissected, as should all palpable nodes.

A	Chemotherapy

Chemotherapy is incorrect. Chemotherapy is not indicated in the routine management of papillary thyroid cancer.

B	Palliative care

Palliative care is incorrect. The prognosis with active therapy is good.

C	Radiotherapy

Radiotherapy is incorrect. External beam radiotherapy is not indicated in the routine management of papillary thyroid cancer, although radio-iodine therapy is routinely utilised after surgical resection.

D	Removal of lymph node

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A 60-year-old man presents with a haemoglobin level of 18 g/dl, raised serum vitamin B12 level, pruritus, neutrophilia, thrombocytosis and splenomegaly. You understand that he previously attended his GP with macrocytosis and was advised to take vitamin B supplements.

Which one of the following is the most likely diagnosis?

A	Haemochromatosis
B	Polycythaemia rubra vera
C	Secondary polycythaemia
D	Thrombotic thrombocytopaenic purpura (TTP)
E	Von Willebrand's disease

45466

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Previous Question | Skip Question

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This man has raised haemoglobin, with symptoms suggestive of primary polycythaemia such as pruritus, and he also has splenomegaly, consistent with the myeloproliferative nature of this disorder. He has a raised neutrophilcount and platelet count, which is also found in myeloproliferative conditions.

A	Haemochromatosis

Haemochromatosis is incorrect. Haemochromatosis does not lead to a raised haemoglobin level, and would not cause a raised neutrophil count, platelet count or splenomegaly.

C	Secondary polycythaemia

Secondary polycythaemia is incorrect. Secondary polycythaemia would not cause the symptoms, signs or other blood abnormalities that are discussed above.

D	Thrombotic thrombocytopaenic purpura (TTP)

Thrombotic thrombocytopaenic purpura (TTP) is incorrect. TTP causes a microangiopathic haemolytic anaemia. Patients with TTP are very unwell, with cerebral and renal compromise.This certainly is not the case in this question, given the presentation in the scenario.

E	Von Willebrand's disease

Von Willebrand's disease is incorrect. Von Willebrand's disease is entirely false as this is a clotting disorder and nothing to do with blood cells.

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A 32-year-old man comes to the clinic for routine review. He had an emergency splenectomy after falling off a horse some 1 year earlier.

Which one of the following would you expect to see on the blood film?

A	Auer rods
B	Heinz bodies
C	Howell-Jolly bodies
D	Pappenheimer bodies
E	Schwann cells

47218

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C Howell-Jolly bodies

Howell-Jolly bodies are typical blood film findings following splenectomy.

A Auer rods

Auer rods is incorrect. Auer rods are seen in blast cells in acute myeloid leukaemia.

B Heinz bodies

Heinz bodies is incorrect. Heinz bodies are related to red cell oxidation, and are seen in patients who are particularly susceptible to this, such as those with G6PD deficiency.

D Pappenheimer bodies

Pappenheimer bodies is incorrect. Pappenheimer bodies are granules of iron found within red cells, and are a type of inclusion body formed by phagosomes which have engulfed excessive amounts of iron.

E Schwann cells

Schwann cells is incorrect. Schwann cells are false as these are part of the peripheral nervous system.

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A 70-year-old woman is investigated for recurrent chest infections and bleeding. Routine investigations show a WCC 32 × $10^3/mm^3$, Hb 9.1 g/dl, platelets 37 × $10^3/mm^3$, with a blood film showing cells of the myeloid series at various stages of maturation.

Which further investigation will be most helpful in terms of diagnosis?

A	Cytogenetic analysis
B	Neutrophil LAP score
C	Bone marrow trephine
D	Immunophenotyping
E	Bone marrow aspirate

41720

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Previous Question | Skip Question

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Explanation

C	Bone marrow trephine

This lady has anaemia, a raised white cell count and a significant thrombocytopenia. The blood film shows myeloid precursors. This could be suggestive of CML, but equally well myelofibrosis can show immature myeloid precursors in the peripheral blood as well. In CML, the platelet count is usually raised and not significantly reduced. This therefore points to a more likely diagnosis of myelofibrosis. Therefore bone marrow trephine will give the diagnosis of myelofibrosis.

D	Immunophenotyping

Immunophenotyping is incorrect. Immunophenotyping may show immature cells consistent with an underlying haematological malignancy, although a bone marrow trephine is still likely to be required to demonstrate bone marrow architecture.

A	Cytogenetic analysis

Cytogenetic analysis is incorrect. Cytogenetic analysis is not the most helpful investigation. It is important to exclude chronic myeloid leukaemia by showing the absence of the Philadelphia chromosome, but this does not help in identifying a positive diagnosis.

B	Neutrophil LAP score

Neutrophil LAP score is incorrect. Neutrophil LAP score is a very old-fashioned score and really should be banished to the history books!

E	Bone marrow aspirate

A bone marrow aspirate is incorrect - Bone marrow aspirate ,

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reduced. This therefore points to a more likely diagnosis of myelofibrosis. Therefore bone marrow trephine will give the diagnosis of myelofibrosis.

D	Immunophenotyping

Immunophenotyping is incorrect. Immunophenotyping may show immature cells consistent with an underlying haematological malignancy, although a bone marrow trephine is still likely to be required to demonstrate bone marrow architecture.

A	Cytogenetic analysis

Cytogenetic analysis is incorrect. Cytogenetic analysis is not the most helpful investigation. It is important to exclude chronic myeloid leukaemia by showing the absence of the Philadelphia chromosome, but this does not help in identifying a positive diagnosis.

B	Neutrophil LAP score

Neutrophil LAP score is incorrect. Neutrophil LAP score is a very old-fashioned score and really should be banished to the history books!

E	Bone marrow aspirate

A bone marrow aspirate is incorrect - Bone marrow aspirate , because it is often not possible to obtain bone marrow fluid in myelofibrosis. This is because of the fibrotic material in the marrow. This is termed a dry tap.

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A 24-year-old Kenyan student presents to the Emergency Department with fevers and rigors. On examination he is found to have massive splenomegaly. He admits to having had malaria in the past and to having taken prophylaxis intermittently. The laboratory staff reports infection with *Plasmodium malariae* after examining the blood film. Antimalarial treatment is commenced but 2 days later he is acutely unwell. The haemoglobin is 4.6 g/l, reticulocytes 40%, creatinine 450 mmol/l and there is oliguria.

What is the likely diagnosis?

A	Blackwater fever
B	Drug-induced haemolysis
C	G6PD deficiency
D	Sickle cell disorder
E	Tropical splenomegaly syndrome

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Explanation

A	Blackwater fever

This man has become very unwell after treatment for malaria has started. He has become acutely anaemic. The raised reticulocyte count suggests either bleeding or haemolysis. There is evidence of acute renal impairment. This is consistent with the development of blackwater fever. This is a rare complicationconsisting of intravascular haemolysis that occurs in the acute phase of malaria treatment. This can cause intense jaundice, and can be associated with renal shutdown.

B	Drug-induced haemolysis

Drug-induced haemolysis is incorrect. Drug-induced haemolytic anaemia can occur, but usually causes extravascularhaemolysis. This man is very unwell, suggesting intravascular breakdown of haemoglobin with the development of acute renal impairment.

C	G6PD deficiency

G6PD deficiency is incorrect. The most common type in Africans is type A. Anti-malarials such as chloroquine can precipitate an episode of haemolysis. Heinz bodies are oxidised, resulting in denatured haemoglobin. These are removed by the spleen during episodes of haemolysis, causing bite and blister cells. Therefore, some of the haemolytic process is occurring in the spleen,ie extravascular. The current picture is more compatible with severe intravascularhaemolysis occurring very shortly after the commencement of anti-malarial therapy.

D	Sickle cell disorder

Sickle cell disorder is incorrect. Sickle trait can protect patients from malaria. There are no other features on the blood film suggest a sickle cell disorder.

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intravascularhaemolysis occurring very shortly after the commencement of anti-malarial therapy.

D	Sickle cell disorder

Sickle cell disorder is incorrect. Sickle trait can protect patients from malaria. There are no other features on the blood film to suggest a sickle cell disorder.

E	Tropical splenomegaly syndrome

Tropical splenomegaly syndrome is incorrect. Tropical splenomegaly syndrome is also known as hyper-reactive malarial syndrome. This is present in residents of regions where malaria is endemic. This can be found in patients who live in endemic areas, who have recurrent malarial infection and who are inadequately treated. Repeated infection leads to an exaggerated immune response that causes massive splenomegaly,as well as hepatomegaly. However, this is not associated with such a profound anaemia, haemolysis or acute renal impairment as observed in this patient.

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A 46-year-old patient has been referred because of pyrexia of unknown origin. He has had pyrexia for the last month interrupted by short afebrile episodes. Blood cultures and an infection screen were both negative. On examination his temperature is 38°C, and he has palpable, non-tender neck lymph nodes.

Which one of the following is the most likely diagnosis?

A	Acute myeloblastic leukaemia
B	Chronic myeloid leukaemia
C	Hodgkin's disease
D	Infectious mononucleosis
E	Malaria

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C Hodgkin's disease

Hodgkin's disease, sounds like the correct answer here. Patients with classical Hodgkin's disease usually present with palpable, non-tender lymphadenopathy, particularly above the diaphragm. Approximately one third of patients present with fevers, night sweats and/or weight loss. There can be a presentation of pyrexia of unknown origin.

A Acute myeloblastic leukaemia

Acute myeloblastic leukaemia (AML) is incorrect. Although this may lead to infections and fevers, again it does not usually cause lymphadenopathy in the neck.

B Chronic myeloid leukaemia

Chronic myeloid leukaemia (CML) is incorrect. CML, does not cause pyrexia, and it does not cause lymphadenopathy.

D Infectious mononucleosis

Infectious mononucleosis is incorrect. Infectious mononucleosis would be an important differential. The question does say, however, that an infection screen is negative, making this less likely than Hodgkin's disease.

E Malaria

Malaria is incorrect. There is no suggestion of foreign travel in this patient.

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A 45-year-old male smoker presents with a short history over the last few weeks of haemoptysis and increasing shortness of breath. A chest X-ray shows a right hilar mass. He is admitted to hospital for diagnostic investigations and staging. These reveal the presence of hepatic lesions. During his admission, he develops a left hemiparesis.

Which one of the following is the most likely histological diagnosis?

A	Adenocarcinoma of the lung
B	Large-cell lung carcinoma
C	Lymphoma
D	Small-cell lung carcinoma
E	Squamous-cell lung carcinoma

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D	Small-cell lung carcinoma

Small-cell lung cancer is the most likely diagnosis. This is an aggressive cancer which typically presents with a short history and 80–90% will have metastases at the time of presentation.

In this patient, the liver lesions are likely to represent metastases and his development of left-sided weakness suggests the likely presence of cerebral metastases. Cytotoxic chemotherapy with a platinum-based regimen would be the treatment of choice. Initially small-cell lung cancer is chemosensitive and an improvement may be expected; however, this is usually short-lived and the median survival is 6–12 months.

A	Adenocarcinoma of the lung

Adenocarcinoma of the lung is incorrect. Owing to a longer natural history this pathological subtype of lung cancer is less likely.

B	Large-cell lung carcinoma

Large-cell lung carcinoma is incorrect. Owing to a longer natural history this pathological subtype of lung cancer is less likely.

C	Lymphoma

Lymphoma is incorrect. However, this diagnosis would need to be excluded as lymphoma is potentially curable. The smoking history and respiratory symptoms make lung cancer more likely.

E	Squamous-cell lung carcinoma

Squamous-cell lung carcinoma is incorrect. Owing to a longer natural history this pathological subtype of lung cancer is le

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A 58-year-old businessman presents with bilateral leg weakness that has suddenly become worse over the last 12 hours. Some 10 months ago he had a lobar resection for a stage-II squamous-cell carcinoma followed by radiotherapy and adjuvant chemotherapy. He has had a dull ache in his lower back over the past 3 months, but put this down to arthritis from when he used to play rugby as a young man. On examination there is reduced power and altered sensation in both legs.

Which one of the following is the most likely cause of the current problem?

A	Paraneoplastic myelopathy
B	Peripheral neuropathy secondary to carcinomatosis
C	Secondary spinal tumour deposit
D	Spinal cord compression as a result of vertebral metastases
E	Spinal tuberculosis

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Previous Question Skip Question

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D Spinal cord compression as a result of vertebral metastases

Spinal cord compression as a result of vertebral metastases is the correct answer here. This man has bilateral leg weakness which has come on suddenly, with a background history of lung cancer. He has both reduced power and altered sensation in both legs. This is therefore spinal cord compression until proved otherwise. The most common cancers to give rise to spinal cord compression are breast, bronchus, prostate, multiple myeloma and high-grade non-Hodgkin's lymphoma. Urgent MRI scanning should be performed.

A Paraneoplastic myelopathy

Paraneoplastic myelopathy is incorrect. The patient has evidence of neurological involvement, with reduced power and altered sensation.

B Peripheral neuropathy secondary to carcinomatosis

Peripheral neuropathy secondary to carcinoma is incorrect. This comes on slowly, but the clinical history here is a sudden onset of bilateral leg weakness.

C Secondary spinal tumour deposit

Secondary spinal tumour deposit is incorrect. Secondary spinal tumour deposit is possible, but this does not necessarily impinge on the spinal cord, whereas this man clearly has evidence of neurological involvement.

E Spinal tuberculosis

Spinal tuberculosis is incorrect. Spinal tuberculosis is very rare. There is nothing in the history to suggest this.

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A 38-year-old woman is prescribed 3 units of blood after heavy PV loss following the delivery of her fifth child. Twenty minutes into the first unit of blood she spikes a temperature of 39 °C and suffers rigors.

Which one of the following is the most likely cause?

A	A delayed haemolytic transfusion reaction caused by red cell antibodies in the patient reacting against red cells in the unit of blood
B	A reaction between white cell antibodies in the patient and white cells in the unit of blood producing a febrile non-haemolytic transfusion reaction
C	Anaphylaxis resulting from a reaction between anti-IgA antibody in the patient, who is IgA deficient, and IgA in the unit of blood
D	An immediate haemolytic transfusion reaction caused by administration of an A Rh-positive unit of blood to an O Rh-positive patient
E	Septicaemia resulting from transfusion of a unit of blood contaminated by bacteria

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B	A reaction between white cell antibodies in the patient and white cells in the unit of blood producing a febrile non-haemolytic transfusion reaction

A reaction between white cell antibodies in the patient and white cells in the unit of blood producing a febrile non-haemolytic transfusion reaction is the most likely cause of the presentation. Please note that white cells are leukodepleted from packed red cell units, which has been mandatory in the UK since 1999 as a measure to potentially reduce the risk of variant CJD transmission by transfusion, (although it isn't possible to totally eliminate them).

A	A delayed haemolytic transfusion reaction caused by red cell antibodies in the patient reacting against red cells in the unit of blood

A delayed haemolytic transfusion reaction caused by red cell antibodies in the patient reacting against red cells in the unit of blood is incorrect. A delayed haemolytic transfusion reaction is false, because this would occur a number of days after the transfusion. This transfusion reaction has occurred 20 min into the first unit of blood that she has received.

C	Anaphylaxis resulting from a reaction between anti-IgA antibody in the patient, who is IgA deficient, and IgA in the unit of blood

Anaphylaxis resulting from a reaction between anti-IgA antibody in the patient, who is IgA deficient, and IgA in the unit of blood is incorrect. There are no symptoms to suggest anaphylaxis.

D	An immediate haemolytic transfusion reaction caused by administration of an A Rh-positive unit of blood to an O Rh-positive patient

An immediate haemolytic transfusion reaction caused by

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A	A delayed haemolytic transfusion reaction caused by red cell antibodies in the patient reacting against red cells in the unit of blood

A delayed haemolytic transfusion reaction caused by red cell antibodies in the patient reacting against red cells in the unit of blood is incorrect. A delayed haemolytic transfusion reaction is false, because this would occur a number of days after the transfusion. This transfusion reaction has occurred 20 min into the first unit of blood that she has received.

C	Anaphylaxis resulting from a reaction between anti-IgA antibody in the patient, who is IgA deficient, and IgA in the unit of blood

Anaphylaxis resulting from a reaction between anti-IgA antibody in the patient, who is IgA deficient, and IgA in the unit of blood is incorrect. There are no symptoms to suggest anaphylaxis.

D	An immediate haemolytic transfusion reaction caused by administration of an A Rh-positive unit of blood to an O Rh-positive patient

An immediate haemolytic transfusion reaction caused by administration of an A Rh-positive unit of blood to an O Rh-positive patient is incorrect. There are no clinical features of this, such as dyspnoea, back pain or cardiovascular collapse.

E	Septicaemia resulting from transfusion of a unit of blood contaminated by bacteria

Septicaemia resulting from transfusion of a unit of blood contaminated by bacteria is incorrect. The clinical scenario is much more likely to be due to a febrile non-haemolytic transfusion reaction.There are no other symptoms to suggest sepsis, su cardiovascular instability or positive blood cultures.

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A woman is started on hormone replacement therapy for menopausal symptoms.

Which one of the following is likely to be correct for her in 5 years time?

A	Increased risk of Alzheimer's disease
B	Increased risk of large bowel carcinoma
C	Increased risk of osteoporotic fracture
D	Increased risk of pulmonary thromboembolism
E	Reduced risk of myocardial infarction

46509

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Previous Question | Skip Question

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D	Increased risk of pulmonary thromboembolism

Advantages of hormone replacement therapy (HRT) include improvement in menopausal symptoms and protection against fractures of the wrist, spine and hip secondary to osteoporosis. Positive effects may include possible reductions in the incidence of both Alzheimer's disease and large bowel carcinoma.

A number of recent studies, however (including the very large women's health study), have raised the possibility of increased mortality associated with prolonged use of HRT. Long-term HRT usage is associated with increased risk of breast cancer, cardiovascular disease (including myocardial infarction) and thromboembolism. The risk of venous thromboembolism is increased two- to three-fold in women taking HRT. Therefore, it is not recommended for long-term use and bisphosphonates are a better choice for treatment of osteoporosis.

C	Increased risk of osteoporotic fracture

Increased risk of osteoporotic fracture is incorrect. HRT offers protection against osteoporotic fracture.

A	Increased risk of Alzheimer's disease

Increased risk of Alzheimer's disease is incorrect. HRT offeres reduction in the incidence of Alzheimer's disease.

B	Increased risk of large bowel carcinoma

Increased risk of large bowel carcinoma is incorrect. HRT offers reduction in the incidence of large bowel carcinoma.

E	Reduced risk of myocardial infarction

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Reduced risk of myocardial infarction is incorrect. Increased

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thromboembolism. The risk of venous thromboembolism is increased two- to three-fold in women taking HRT. Therefore, it is not recommended for long-term use and bisphosphonates are a better choice for treatment of osteoporosis.

C	Increased risk of osteoporotic fracture

Increased risk of osteoporotic fracture is incorrect. HRT offers protection against osteoporotic fracture.

A	Increased risk of Alzheimer's disease

Increased risk of Alzheimer's disease is incorrect. HRT offeres reduction in the incidence of Alzheimer's disease.

B	Increased risk of large bowel carcinoma

Increased risk of large bowel carcinoma is incorrect. HRT offers reduction in the incidence of large bowel carcinoma.

E	Reduced risk of myocardial infarction

Reduced risk of myocardial infarction is incorrect. Increased mortality from myocardial infarction is associated with prolonged use of HRT.

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7:46

A 33-year-old woman presents with weakness in her left arm and a severe headache. She has been unwell with diarrhoea and nausea over the past few days coupled with fevers. You understand she visited a play farm with her 3-year-old child a few days earlier. She is 20 weeks' pregnant with her second child. On examination she is pyrexial 37.8°C, her BP is 155/85 mmHg and her pulse is 90/min. She has a vasculitic type rash on her skin and a 4/5 power weakness of her left arm. Investigations:

Hb	102 g/l
WCC	13.2 x 10^9/l
PLT	52 x 10^9/l
Na^+	138 mmol/l
K^+	4.2 mmol/l
Creatinine	187 µmol/l

Which one of the following treatments is likely to be most appropriate?

A	Benzylpenicillin
B	Immunoglobulins
C	Methylprednisolone
D	Plasma exchange
E	Rituximab

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Explanation

D	Plasma exchange

This lady has a preceding episode of diarrhoea and nausea. She is now febrile with neurological weakness of her left arm. She is anaemic and thrombocytopaenic, suggesting the possibility of microangiopathic haemolytic anaemia. In addition she has evidence of renal impairment. This therefore suggests an underlying diagnosis of thrombotic thrombocytopaenic purpura (TTP). This is best treated in a regional centre with urgent plasma exchange.

A	Benzylpenicillin

Benzylpenicillin is incorrect. This lady needs urgent plasma exchange for TTP, not antibiotics.

B	Immunoglobulins

Immunoglobulins is incorrect. This lady needs urgent plasma exchange for TTP, not infusion of immunoglobulins.

C	Methylprednisolone

Methylprednisolone is incorrect. This lady needs urgent plasma exchange for TTP. Methylprednisolone can be sometimes used as an adjunctive therapy to plasma exchange, but the priority here is urgent plasma exchange.

E	Rituximab

Rituximab is incorrect. Rituximab is an anti-CD20 molecule which reduces the auto-immune component of this condition, but the most important initial therapy is urgent plasma exchange.

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A 37-year-old man previously fit and well man presents with hip pain and is diagnosed with a soft tissue sarcoma. He is found to have metastases in the lungs and bones. He is prescribed ifosfamide as part of a palliative multi-agent chemotherapy regime.

Why was he also prescribed MESNA (2-mercaptoethane sulfonate Na)?

A	To prevent alopecia
B	To prevent haemorrhagic cystitis
C	To prevent hepatic fibrosis
D	To prevent mucositis
E	To prevent pulmonary fibrosis

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Previous Question | Skip Question

Calculator

Normal Values

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Explanation

B	To prevent haemorrhagic cystitis

MESNA is sodium 2-mercapto-ethanesulfonate. MESNA is a compound designed to function as a regional detoxificant of urotoxic chemotherapeutic agents such as ifosfamide and cyclophosphamide. After absorption MESNA is oxidised to MESNA disulfide; in the kidney it is reduced to MESNA, the free thiol compound, and this then binds to 4-hydroxy-ifosfamide, forming a non-urotoxic 4-sulfoethylthioifosfamide. Patients are advised to keep well hydrated following chemotherapy and to pass urine as soon as the urge is felt to minimise exposure of the bladder epithelium to cytotoxic agents.

A	To prevent alopecia

To prevent alopecia is incorrect. The use of a cold-cap is used to reduce chemotherapy-induced alopecia.

C	To prevent hepatic fibrosis

To prevent hepatic fibrosis is incorrect. Methotrexate not ifosfamide is associated with hepatic fibrosis.

D	To prevent mucositis

To prevent mucositis is incorrect. Oral care protocols exist for the management of chemotherapy-induced mucositis.

E	To prevent pulmonary fibrosis

To prevent pulmonary fibrosis is incorrect. Methotrexate not ifosfamide is associated with pulmonary fibrosis.

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A 16-year-old young man with sickle cell anaemia is admitted with recent breathlessness. He is febrile and has a clear chest with saturations of 98% on air. From his outpatient notes his usual Hb is 90 g/l. FBC taken in the Emergency Department shows WCC 8.6 × $10^3/mm^3$, Hb 47 g/l, platelets 573 × $10^3/mm^3$ with a bilirubin 25 mmol/l.

Which investigation is the most useful to perform next?

A	Chest X-ray
B	Parvovirus serology
C	Reticulocyte count
D	Serum haptoglobin
E	Urinary haemosiderin

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Previous Question | Skip Question

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C Reticulocyte count

A reticulocyte count will be the next most useful investigation.This is a very quick investigation to have performed, and is usually done at the same time as the full blood count, although it is not routinely reported. Essentially this young man has had a significant decline in his haemoglobin. This could be due to a significant episode of haemolytic anaemia, butequally well, could be due to an aplastic crisis, when the bone marrow stops producing redblood cells. A reticulocyte count would be very helpful to distinguish the two. When there is haemolysis occurring, one would imagine that the bone marrow would function appropriately, to try to produce increased amounts of red blood cells, therefore resulting in an increased reticulocyte count. In an aplastic crisis, the bone marrow will not be making red blood cells, resulting in a very low reticulocyte count.

A Chest X-ray

Chest X-ray is incorrect. Chest X-ray will not distinguish between a haemolytic or an aplastic crisis.

B Parvovirus serology

Parvovirus serology is incorrect. Parvovirus serology will take a number of days to come back, and will not be the first investigation in pointing to a possible aplastic crisis.

D Serum haptoglobin

Serum haptoglobin is incorrect. Serum haptoglobin often takes many days to turn around, and is usually only reduced in cases of intravascular haemolytic anaemia.

E Urinary haemosiderin

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A 17-year-old girl who was asymptomatic presented with a painless cervical lymph node. Chest X-ray showed bilateral mediastinal lymph nodes.

What is the most likely diagnosis?

A	Burkitt's lymphoma
B	Hodgkin's lymphoma
C	Mantle cell lymphoma
D	Non-Hodgkin's lymphoma
E	Sarcoidosis

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Previous Question Skip Question

Calculator

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B Hodgkin's lymphoma

This presentation is entirely classical of Hodgkin's disease, with lymphadenopathy in the cervical and mediastinal area. A lymph node biopsy is clearly required to establish the diagnosis, along with a full CT scan of the chest, neck, abdomen and pelvis.

E Sarcoidosis

Sarcoidosis is incorrect. Sarcoidosis can be a cause of enlarged mediastinal lymph nodes, but there are no other features in this question to suggest this.

A Burkitt's lymphoma

Burkitt's lymphoma is incorrect. This is rare in this age group. Patients with Burkitt's lymphoma are often very unwell with weight loss and night sweats, often with much more widespread lymphadenopathy.

C Mantle cell lymphoma

Mantle cell lymphoma is incorrect. Mantle cell lymphoma again is very rare in this age group. This is a form of non-Hodgkin's lymphoma that is much more common in elderly patients, again presenting with more widespread lymphadenopathy.

D Non-Hodgkin's lymphoma

Non-Hodgkin's lymphoma incorrect. The presentation in the question is entirely typical of Hodgkin's lymphoma, but a biopsy of the affected lymph node in the neck is clearly required to give a definitive histological diagnosis.

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A patient diagnosed with carcinoma of the colon underwent a hemicolectomy. Staging is T3, N1, M0.

Based on large clinical trials, which treatment is most likely to improve this patient's overall survival?

A	Chemotherapy with 5-fluorouracil and folinic acid
B	High-dose multivitamins
C	Low-fat diet
D	Postoperative radiotherapy
E	Postoperative radiotherapy and chemotherapy with doxorubicin

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Previous Question | Skip Question

Calculator

Normal Values

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Explanation

A	Chemotherapy with 5-fluorouracil and folinic acid

This patient has Dukes' C carcinoma of the colon. The Dukes' classification of colorectal carcinomas remains the mainstay of tumour staging:

- Stage A disease is confined to the bowel wall with no extension to the serosal fat.
- Stage B disease involves the full thickness of the bowel wall with extension through to the serosa.
- Stage C involves the spread of tumour to draining lymph nodes.
- Stage D disease involves distant spread, primarily to the liver.

5-Fluorouracil (5-FU) (with folinic acid) prolongs the survival of patients with stage D disease. Randomised trials have also shown that 5-FU improves survival in stage C disease when used as adjuvant therapy to surgery. The evidence of survival advantage from adjuvant chemotherapy in stage B disease is less clear.

E	Postoperative radiotherapy and chemotherapy with doxorubicin

Postoperative radiotherapy and chemotherapy with doxorubicin is incorrect. Post- (and pre-) operative radiotherapy is used primarily in cancers of the rectum and anus where significant survival benefits have been proven, but is not utilised in the routine management of colon cancer.

B	High-dose multivitamins

High-dose multivitamins is incorrect. There is no role for high-dose multivitamins in cancer management.

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7:53
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A 65-year-old patient has noticed worsening tiredness, weight loss and shortness of breath over the last 6 months. Lymphadenopathy and splenomegaly are present. His peripheral lymphocyte count is $60 \times 10^9/l$ ($(1.0–3.0) \times 10^9/l$).

Which one of the following is the most likely diagnosis?

A	Chronic lymphocytic leukaemia
B	Chronic myeloid leukaemia
C	Hodgkin's disease
D	Myeloma
E	Non-Hodgkin's disease

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Previous Question Skip Question

Calculator

Normal Values

Annotation
Stop Share
Audio
Video
Share
Participants
More

Explanation

A	Chronic lymphocytic leukaemia

This is an elderly man with a peripheral blood lymphocytosis with lymphadenopathy and splenomegaly. This is a typical presentation of patients with chronic lymphocytic leukaemia. In fact, the most common presentation of patients with chronic lymphocytic leukaemia is an incidental blood count that shows a lymphocytosis.

B	Chronic myeloid leukaemia

Chronic myeloid leukaemia (CML) is incorrect. CML is a myeloid disorder that causes an increase in neutrophils and myelocytes in the peripheral blood. It is nothing to do with a lymphocytosis.

C	Hodgkin's disease

Hodgkin's disease is incorrect. Peripheral blood lymphocytosis in Hodgkin's disease is very rare.

D	Myeloma

Myeloma is incorrect. Myeloma is clearly false. This would not cause lymphadenopathy and splenomegaly, nor would it cause a lymphocytosis.

E	Non-Hodgkin's disease

Non-Hodgkin's disease is incorrect. Non-Hodgkin's disease is another differential diagnosis along with CLL. In fact, from this presentation and information, it is not possible to discern that the correct answer is CLL rather than a form of non-Hodgkin's lymphoma with a peripheral blood lymphocytosis. In terms of frequen more likely that the underlying diagnosis will be CLL, b be definitively stated until cell surface markers (immunophenotyping) has been performed. A number of forms of

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A 62-year-old woman presents to the Emergency Department with bleeding around her gums and bruising. She has recently visited a farm with her granddaughter and both of them have suffered from diarrhoea over the past few days. Medication of note includes omeprazole for reflux and trimethoprim for a urinary tract infection. On examination her BP is 155/92 mmHg, pulse is 80/min and regular. Her chest is clear and abdomen is soft and non-tender. While you examine her she suffers a short generalised tonic-clonic seizure. Investigations:

Hb	81 g/l
MCV	104 fl, reticulocytes seen on film
WCC	13.2 x 10^9/l
PLT	15 x 10^9/l
Na^+	138 mmol/l
K^+	6.1 mmol/l
Creatinine	204 micromol/l
Albumin	37 g/l
ALT	132 U/l

Which of the following is the most likely diagnosis?

A	Cold agglutinin disease
B	Drug-induced thrombocytopaenia
C	Idiopathic thrombocytopaenic purpura
D	Parvovirus infection

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farm with her granddaughter and both of them have suffered from diarrhoea over the past few days. Medication of note includes omeprazole for reflux and trimethoprim for a urinary tract infection. On examination her BP is 155/92 mmHg, pulse is 80/min and regular. Her chest is clear and abdomen is soft and non-tender. While you examine her she suffers a short generalised tonic-clonic seizure. Investigations:

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Which of the following is the most likely diagnosis?

A	Cold agglutinin disease
B	Drug-induced thrombocytopaenia
C	Idiopathic thrombocytopaenic purpura
D	Parvovirus infection
E	Thrombotic thrombocytopaenic purpura

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Explanation

E	Thrombotic thrombocytopaenic purpura

This lady sounds as if she has an episode of infective diarrhoea following a recent visit to a farm. She had a seizure while being examined. She is anaemic and thrombocytopaenic, with a normal white cell count. Reticulocytes are seen on the blood film.

This should raise the suspicion of microangiopathic haemolytic anaemia, and there is in addition evidence of acute renal failure. This, combined with neurological symptoms, points towards TTP being the most likely diagnosis.

A	Cold agglutinin disease

Cold agglutinin disease is incorrect. Cold agglutinin disease would usually result in anaemia, but would not cause thrombocytopaenia, renal impairment or neurological symptoms.

B	Drug-induced thrombocytopaenia

Drug-induced thrombocytopaenia is incorrect. Drug-induced thrombocytopaenia again would only cause a thrombocytopaenia but not anaemia. It would only be associated with neurological problems if there was an associated intracerebral bleed, and would not be connected with renal impairment.

C	Idiopathic thrombocytopaenic purpura

Idiopathic thrombocytopaenic purpura (ITP) is incorrect. It would only be associated with neurological problems if there was an associated intracerebral bleed. Intracranial bleeding is in fact rare in ITP.

D	us infection

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A 68-year-old with known small-cell lung carcinoma presents with a history of increasing confusion and seizures over a period of several weeks. There are no focal neurological signs and haematological and biochemical investigations are normal. A brain CT and MRI are normal.

What underlying cause do you suspect?

A	Alzheimer's dementia
B	Cerebral metastases
C	Paraneoplastic disorder
D	Septicaemia
E	Steroid related

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Previous Question | Skip Question

Calculator

Normal Values

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Explanation

C	Paraneoplastic disorder

Paraneoplastic neurological disorders (PNDs) are rare syndromes that are caused by, or associated with, an underlying malignancy. PNDs do not occur by direct tumour involvement in neural tissue, but are thought to be caused by crossed antigenicity or tumour-peptide release. PNDs can affect many parts of the nervous system and, unlike most gradual neurodegenerative disorders, PNDs typically exhibit a rapid onset of symptoms. Although PNDs most often occur in small-cell lung cancer, they can also be caused by a variety of other cancers including breast, colon and testicular cancers.

Neurological PNDs include encephalitis, myelopathy, neuropathy, myopathy, cerebellar degeneration and the Eaton–Lambert syndrome (myasthenic syndrome, resulting from an inappropriate immune response to the neuromuscular junction). Other types of PND include endocrine (eg Cushing syndrome, syndrome of inappropriate antidiuretic hormone secretion); mucocutaneous (eg dermatomyositis, acanthosis nigracans) and haematological (eg polycythaemia), as well as pyrexia of unknown origin.

A	Alzheimer's dementia

Alzheimer's dementia is incorrect. The timescale is too short for Alzheimer's dementia.

B	Cerebral metastases

Cerebral metastases is incorrect. The normal CT/MRI makes cerebral metastases unlikely.

D	Septicaemia

Septica incorrect. Sepsis is an important differential diagnosis and needs to be excluded.

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You review a woman who is 34 weeks' pregnant. She is noted on routine blood testing to be anaemic, with a raised unconjugated bilirubin. You suspect that she may have microangiopathic haemolytic anaemia (MHA).

Which one of the following features/underlying conditions is most likely to be associated with MHA?

A	HELLP syndrome
B	Idiopathic thrombocytopaenia
C	Normal platelet count
D	Normal reticulocyte count
E	Normal unconjugated bilirubin

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Previous Question | Skip Question

Calculator

Normal Values

A HELLP syndrome

HELLP syndrome, as outlined in the question, is a syndromecharacterised by haemolysis, elevated liver enzymes and a low platelet count. This is a microangiopathic haemolytic anaemia that is pregnancy related.

C Normal platelet count

Normal platelet count is incorrect. Microangiopathic haemolytic anaemias are usually associated with thrombocytopaenia.

B Idiopathic thrombocytopaenia

Idiopathic thrombocytopaenia (ITP) is incorrect. ITP has nothing to do with microangiopathic haemolytic anaemias.ITP is characterised by an isolated thrombocytopaenia with no evidence of anaemia or haemolysis. This is in contrast to microangiopathic haemolytic anaemia.

D Normal reticulocyte count

Normal reticulocyte count is incorrect. A normal reticulocyte count is against a microangiopathic haemolytic anaemia, because the haemolysis causes a raised reticulocyte count.

E Normal unconjugated bilirubin

Normal unconjugated bilirubin is incorrect. The haemolysis would result in a raised unconjugated bilirubin.

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A 30-year-old intravenous drug abuser is seen in the Emergency Department after a large per vagina (PV) bleed. She is 34 weeks' pregnant. She is on low molecular weight heparin following a deep vein thrombosis (DVT) at 24 weeks. A full blood count at 32 weeks was normal and anti-Xa levels within the therapeutic range fibrinogen 6 g/dl. She is transfused three units of crossmatched blood but 4 hours later is noted to be leaking from her Venflon sites, and has several large bruises on her arms and legs. Other results are haemoglobin 9.7 g/dl, platelets 54 × 10^9 per litre, blood film shows thrombocytopaenia with some red cell fragmentation, prothrombin time 30 s, activated partial thromboplastin time (APTT) 80 s, fibrinogen 2.2 g/l and D-dimers raised.

Which one of the following is the most likely cause of her clotting abnormalities?

A	Disseminated intravascular coagulation
B	Heparin overdose
C	Immune thrombocytopaenic purpura
D	Liver failure
E	Thrombotic thrombocytopaenic purpura

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A	Disseminated intravascular coagulation

Disseminated intravascular coagulation (DIC) is the most likely cause of this lady's clotting abnormalities. The particular clue here is that she is noted to be leaking from her Venflon sites, and this is a particular marker of disseminated intravascular coagulation. What is really important is that this lady has had a significant decline in her fibrinogen. You will see that the fibrinogen at 32 weeks was normal at 6 g/l, which is actually above the normal range.Now in the acute setting, it has fallen to 2.2 g/l. The important aspect to note here is that, although this remains in the normal range, it is below the normal range that one would expect fora pregnant lady. There is evidence of raised D-dimers, with prolongation of the coagulation times as well. There may well be an underlying obstetric reason for the DIC, because she has had a large vaginal bleed.

B	Heparin overdose

Heparin overdose is incorrect. This would not explain the fact that the fibrinogen had fallen, that the D-dimers were raised and the thrombocytopaenia. We are also told that the anti-Xa levels were normal at 32 weeks.

C	Immune thrombocytopaenic purpura

Immune thrombocytopaenic purpura is incorrect. Immune thrombocytopaenia purpura would not explain the prolonged coagulation times or the raised D-dimers.

D	Liver failure

Liver failure is incorrect. There is nothing in the question to suggest liver failure, and again this would not explain the raised D-dimer levels, or have any connection to the vaginal bleed.

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8:00

You review a 48-year-old man who has a diagnosis of colorectal carcinoma. You are considering oxaliplatin therapy for his case.

Which one of the following descriptions best fits with the use of oxaliplatin therapy?

A	Concomitant folinic acid and 5-FU are usually prescribed
B	It is commonly used as monotherapy
C	Motor neuropathy is a common side-effect
D	Ototoxicity is not seen with this platinum derivative
E	Renal function monitoring is only advised in severe renal impairment

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Previous Question | Skip Question

Calculator

Normal Values

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A	Concomitant folinic acid and 5-FU are usually prescribed

Oxaliplatin is licensed for the treatment of metastatic colorectal carcinoma in combination with fluorouracil and folinic acid and it is therefore not routinely administered as a monotherapy. It is given by intravenous infusion. The dose is limited by neurotoxicity (usually sensory polyneuropathy) and it does not usually cause a motor neuropathy. Other side-effects include GI toxicity, ototoxicity and myelosuppression. Renal function monitoring is advised in cases of moderate renal impairment.

NICE guidance (from March 2002) recommends that oxaliplatin use be confined to those patients who have liver metastases only, and which might be amenable to surgical resection after chemotherapy. Irinotecan therapy may be considered in patients who have failed to respond to a platinum-containing therapy.

B	It is commonly used as monotherapy

It is commonly used as monotherapy is incorrect. Oxaliplatin is not routinely administered as a monotherapy. It is licensed for the treatment of colorectal carcinoma in combination with fluorouracil and folinic acid.

C	Motor neuropathy is a common side-effect

Motor neuropathy is a common side-effect is incorrect. Sensory polyneuropathy is commonly seen.

D	Ototoxicity is not seen with this platinum derivative

Ototoxicity is not seen with this platinum derivative is incorrect. Otoxicity, myelosuppression, GI toxicity and neurotoxicity are all seen with oxaliplatin.

E	nction monitoring is only advised in severe renal impairment

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An 80-year-old women regularly attends Haematology Outpatients for her chronic lymphocytic leukaemia (CLL). She has been followed up for 5 years, her condition has remained stable and she has required no treatment. At this clinic attendance, she reports that she has been feeling extremely tired for the last 2 weeks. On examination she is clinically anaemic and mildly jaundiced. She has a 2-cm splenomegaly. There are no other abnormal physical findings.

Her Hb 6.3 g/dl, MCV 106 fl, MCH 29 pg, MCHC 32 g/dl, reticulocytes 205 × 10^9/l (normal range 50–100), WCC 85 × 10^9/litre, with lymphocytes of 65.5 × 10^9/litre and platelets 110 × 10^9/litre.

Which one of the following is the main cause of her anaemia?

A	Autoimmune haemolytic anaemia
B	Progression of chronic lymphocytic leukaemia
C	Iron deficiency due to blood loss
D	Richter's transformation of chronic lymphocytic leukaemia
E	Acute folic acid deficiency

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Previous Question Skip Question

Annotation Stop Share

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A	Autoimmune haemolytic anaemia

This lady now has a macrocytic anaemia with a raised reticulocyte count. The fact that the reticulocyte count is raised suggests that the bone marrow is working correctly, but that blood is either being lost through blood loss or haemolysis. The fact that she is mildly jaundiced points towards the haemolytic anaemia. CLL has a well-recognised association with autoimmune haemolytic anaemia, as well as autoimmune thrombocytopenia.

B	Progression of chronic lymphocytic leukaemia

Progression of the chronic lymphocytic leukaemia is incorrect. The question states that her condition has remained very stable, with only a small amount of splenomegaly and with no significant abnormal physical findings such as progressive lymphadenopathy.

C	Iron deficiency due to blood loss

Iron deficiency due to blood loss is incorrect. This would not explain the fact that she is jaundiced and has splenomegaly. There is no association between iron deficiency, gastrointestinal blood loss and CLL.

D	Richter's transformation of chronic lymphocytic leukaemia

Richter's transformation of chronic lymphocytic leukaemia is incorrect. There is nothing to suggest that this lady has Richter's transformation, which is when CLL transforms into a high-grade lymphoma. Normally this would present with rapidly enlarging lymphadenopathy, hypercalcaemia and general malaise. This is not the case in the present question.

E	Acute folic acid deficiency

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Acute folic acid deficiency is incorrect. This would not result in a

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8:03
On
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A 64-year-old lady presents with tiredness to her GP. Routine examination reveals 2 cm splenomegaly, and bloods reveal a WBC 15 (neutrophils 90%), Hb 12, Plts 650.

Which one of the following is the most likely diagnosis?

A	ALL
B	CLL
C	CML
D	Essential thrombocythaemia
E	Multiple myeloma

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Previous Question | Skip Question

Calculator

Normal Values

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D	Essential thrombocythaemia

This 64-year-old lady has a normal haemoglobin level. She has a neutrophilia, splenomegaly with a raised platelet count. This would therefore be compatible with essential thrombocythaemia. This is one of the myeloproliferative disorders. Mild splenomegaly is common, as is a neutrophil leucocytosis. Treatment in a lady of this age would be with a myelosuppressive agent such as hydroxycarbamide to reduce the platelet count, along with an anti-platelet drug such as aspirin.

A	ALL

ALL is incorrect. There is nothing to suggest an acute leukaemia here, such as the presence of blasts. In addition, patients with acute leukaemia would be expected to be cytopaenic, e.g. with a neutropaenia or thrombocytopaenia.

B	CLL

CLL is incorrect. There is no suggestion of a lymphocytosis here.

C	CML

CML is incorrect. In CML the white cell count is usually much, much higher, and it can be greater than $200 \times 10^9/l$.

E	Multiple myeloma

Multiple myeloma is incorrect. There is nothing to suggest multiple myeloma in the question whatsoever.

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A 65-year-old smoker presents with progressive left shoulder pain of several weeks duration. On direct questioning he admits to a reduction in power and sensation affecting his left hand. Shortly after his initial presentation he develops visual disturbances and a left-sided ptosis.

Which one of the following is the most likely diagnosis?

A	Carpal tunnel syndrome
B	Coronary heart disease
C	Pancoast tumour
D	Syringomyelia
E	Vertebral disc prolapse of the cervical spine

Submit

Previous Question | Skip Question

Calculator

Normal Values

Annotation Stop Share

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E	Vertebral disc prolapse of the cervical spine

Explanation

C	Pancoast tumour

A tumour in the superior pulmonary sulcus (Pancoast tumour) can cause progressive constant pain in the shoulder, upper anterior chest or interscapular region, soon spreading to the arm once the brachial plexus is invaded. Other symptoms of this type of tumour include weakness and atrophy of the muscles of the hand, Horner syndrome (visual disturbance and ptosis), hoarseness and spinal cord compression at levels T1 and T2.

A	Carpal tunnel syndrome

Carpal tunnel syndrome is incorrect. Carpal tunnel syndrome causes symptoms in the hand and wrist.

B	Coronary heart disease

Coronary heart disease is incorrect. Coronary heart disease is associated with exertional left-sided chest pain.

D	Syringomyelia

Syringomyelia is incorrect. Syringomyelia is a rare condition in which an irregular fluid-filled cavity (syrinx) causes a central cord syndrome, usually affecting the cervical area, but may extend the whole length of the cord. Typically, in early adult life the patient notices weakness and wasting of an upper limb and/or loss of the sensation of pain. There is usually areflexia in the arms, a spastic paraparesis and a dissociated sensory loss (retention of common touch and proprioception sense with loss of pain and temperature sensation) in the upper limbs.

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A 52-year-old woman presents to her general practitioner complaining of tiredness and lethargy. She has a 2-year history of menorrhagia with excessive blood loss. Clinically, she is anaemic. Her full blood count is as follows:

Hb	5.9 g/dl (11.5–16.5)
Hct	0.24 (0.36–0.47)
MCV	65 fl (80–96)
MCH	22 pg (28–32)
MCHC	26 g/dl (32–35)
WCC	8.1 × 10^9/l ((4–11) × 109)
Platelets	476 × 10^9/l ((150–400) × 10^9)

She is started on oral iron replacement.

Which one of the following additional factors is most likely to aid iron absorption?

A	A diet consisting mainly of bread and tea
B	Coincident chronic osteomyelitis
C	Ferric chloride tablets
D	Ingestion of an antacid
E	Ingestion of vitamin C

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E Ingestion of vitamin C

Explanation

E Ingestion of vitamin C

Ingestion of vitamin C aids iron absorption. It does this by reducing iron from the ferric to the ferrous form, and by chelating it into a complex which enhances absorption.

A A diet consisting mainly of bread and tea

A diet consisting mainly of bread and tea is incorrect. Precipitating agents that are found in flour (as well as tea) will reduce iron absorption.

B Coincident chronic osteomyelitis

Coincident chronic osteomyelitis is incorrect. Infection will reduce iron absorption.

C Ferric chloride tablets

Ferric chloride tablets is incorrect. Iron absorption is reduced by inorganic iron (the ferric form).

D Ingestion of an antacid

Ingestion of an antacid is incorrect. Ingestion of an anti-acid will reduce iron absorption.

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E	Hodgkin's lymphoma

Mediastinal and cervical lymphadenopathy is a common presentation of Hodgkin's disease. It is unusual to get bone marrow infiltration in Hodgkin's disease. Although other forms of lymphomas may well be possible, Hodgkin's lymphoma is the most likely diagnosis of this presentation.

A	Burkitt's lymphoma

Burkitt lymphoma is incorrect. Patients with Burkitt's lymphoma often have very widespread lymphadenopathy and are very unwell. Bone marrow aspirate and trephine is often infiltrated with lymphoma. However, Hodgkin's lymphoma is much more common than Burkitt's in this age group.

B	Follicular lymphoma

Follicular lymphoma is incorrect. Follicular lymphoma does cause lymphadenopathy. Often the bone marrow is not involved. However, given this presentation, Hodgkin's lymphoma is more prevalent than follicular lymphoma in this age group.

C	Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. This would cause significant blood count abnormalities and would not be associated with lymphadenopathy.

D	Chronic Wuchereria bancrofti infection

Chronic Wuchereria bancrofti is incorrect. Wucheria bancrofti is a very unusual infection. It would be unusual to have this infection in the UK and the infection would be unlikely to cause widespread lymphadenopathy without respiratory disease.

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A 56-year-old woman with known metastatic breast cancer presents to the Emergency Department complaining of headaches, nausea and loss of appetite. Examination is unremarkable. Routine blood tests demonstrate a calcium concentration of 3.22 mmol/l.

Which one of the following is the most appropriate initial management?

A	Intravenous hydrocortisone
B	Intravenous infusion of 0.9% sodium chloride ('normal saline')
C	Intravenous infusion of sodium phosphate
D	Oral bisphosphonate
E	Oral thiazide diuretic

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Previous Question | Skip Question

Calculator

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patient and establish a diuresis. 'Normal saline' is the fluid of choice.

A	Intravenous hydrocortisone

Intravenous hydrocortisone is incorrect. Corticosteroids may occasionally be helpful but are not first-line treatment.

C	Intravenous infusion of sodium phosphate

Intravenous infusion of sodium phosphate is incorrect. Sodium phosphate infusion is dangerous: it lowers the calcium concentration rapidly, but risks causing metastatic calcification.

D	Oral bisphosphonate

Oral bisphosphonate is incorrect. Bisphosphonates are effective, but must be given intravenously to have a rapid effect. Even with intravenous administration, response in serum calcium is usually only seen after 24–48 h.

E	Oral thiazide diuretic

Oral thiazide diuretic is incorrect. A diuretic may be helpful once the patient has been rehydrated, but this should be a loop diuretic, which increases calcium excretion, not a thiazide, as these reduce it.

Learning objective: In the management of malignant hypercalcaemia the priority is to rehydrate the patient. Once this has been achieved, intravenous bisphosphonates should be administered.

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A 23-year-old man presents with a 3–4 cm lump on the right side of his neck, which he first noticed 2 months ago. He tried several homeopathic medications but the lump steadily increased in size. He also noticed some shortness of breath and sweating at night. On examination the mass is firm, non-tender, not fixed to deeper structures or to the skin. He is slightly pale but no other masses are palpable. His temperature is 38°C.

Which one of the following investigations is most likely to be diagnostic?

A	Fine-needle aspiration biopsy of the mass
B	CT scan of the neck
C	Ultrasonography of the neck
D	Excision biopsy
E	MRI scan of the neck

41763

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Previous Question | Skip Question

Calculator

Normal Values

Annotation | Stop Share

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B	CT scan of the neck
C	Ultrasonography of the neck
D	Excision biopsy
E	MRI scan of the neck

Explanation

D	Excision biopsy

Excision biopsy is the investigation that is most likely to be diagnostic here. He has persistent lymphadenopathy and night sweats. Importantly, the node is not tender, pointing against infection. This man therefore needs an excision biopsy to diagnose the most likely diagnosis of lymphoma.

A	Fine-needle aspiration biopsy of the mass

Fine needle aspiration biopsy of the mass is incorrect. FNA biopsy of the mass should be avoided. This will not give enough information to make a firm histological diagnosis. In addition, it merely adds delay before a formal excision biopsy is achieved.

B	CT scan of the neck

CT scan of the neck is incorrect – CT scan of the neck may be important, but it will not reveal a diagnosis.

C	Ultrasonography of the neck

Ultrasound of the neck is incorrect – Ultrasound of the neck may demonstrate the lump, but it will not give a dia

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A 27-year-old man presents to the Emergency Department by emergency ambulance. According to his partner he awoke that morning with a significant change in mood, suffering from anxiety and aggression; this was followed by a convulsive seizure, and since this point he has been drowsy with a reduced GCS of 11. The only history of note has been depressive symptoms, which have increased over the past month. Examination reveals a BP of 165/90 mmHg; pulse is 90/min and regular. He is moving all four limbs but is still very drowsy. Fundoscopy reveals bilateral papilloedema. General physical examination reveals a large left testicular tumour.

Investigations:

Hb	11.3 g/dl
WCC	10.9 x 10^9/l
PLT	181 x 10^9/l
Na^+	137 mmol/l
K^+	4.5 mmol/l
Creatinine	110 µmol/l
Glucose	6.1 mmol/l
ESR	81mm/1st hour

Which of the following is the most likely cause of the rapid deterioration seen here?

A	Cerebral infarction
B	Cerebral oedema
C	Haemorrhage into a metastasis

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8:12
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emergency ambulance. According to his partner he awoke that morning with a significant change in mood, suffering from anxiety and aggression; this was followed by a convulsive seizure, and since this point he has been drowsy with a reduced GCS of 11. The only history of note has been depressive symptoms, which have increased over the past month. Examination reveals a BP of 165/90 mmHg; pulse is 90/min and regular. He is moving all four limbs but is still very drowsy. Fundoscopy reveals bilateral papilloedema. General physical examination reveals a large left testicular tumour.

Investigations:

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Glucose	6.1 mmol/l
ESR	81mm/1st hour

Which of the following is the most likely cause of the rapid deterioration seen here?

A	Cerebral infarction
B	Cerebral oedema
C	Haemorrhage into a metastasis
D	Rapid growth of a metastasis
E	Subarachnoid haemorrhage

Annotation
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Audio
Video
Share
Participants
More

C Haemorrhage into a metastasis

The rapid deterioration, seen over the course of a few hours, is most suggestive of haemorrhage into a metastasis. Teratomas are well known to metastasise via haematogenous spread, including to liver, lung, bone and brain.

B Cerebral oedema

Cerebral oedema is incorrect. A slow build-up in symptoms is usually due to cerebral oedema, which is progressive, surrounding the metastasis.

A Cerebral infarction

Cerebral infarction is incorrect. Given the high likelihood of a cerebral metastasis, there is no reason to expect an alternative, additional diagnosis such as infarction.

D Rapid growth of a metastasis

Rapid growth of a metastasis is incorrect. Rapid growth of a metastasis is unlikely given the time frame of hours, even for very aggressive malignancy.

E Subarachnoid haemorrhage

Subarachnoid haemorrhage is incorrect. Given the high likelihood of a cerebral metastasis, there is no reason to expect an alternative, additional diagnosis such as subarachnoid haemorrhage.

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8:14

A 50-year-old woman presents with acute chest pain and dyspnoea. She is found to have a pulmonary embolus. Examination reveals bilateral ankle oedema, she has a low serum albumin and 24-hour urine protein assessment shows 8 g/d (< 0.2).

Which one of the following is the most likely explanation for these findings?

A	Factor V Leiden
B	Reduced antithrombin III levels
C	Reduced concentration of von Willebrand factor
D	Reduced factor VIII
E	Reduced fibrinogen concentration

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Previous Question | Skip Question

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dyspnoea. She is found to have a pulmonary embolus. Examination reveals bilateral ankle oedema, she has a low serum albumin and 24-hour urine protein assessment shows 8 g/d (< 0.2).

Which one of the following is the most likely explanation for these findings?

Your answer was correct

A	Factor V Leiden
B	Reduced antithrombin III levels
C	Reduced concentration of von Willebrand factor
D	Reduced factor VIII
E	Reduced fibrinogen concentration

Explanation

B	Reduced antithrombin III levels

This lady has nephrotic range proteinuria. As a result of the very significant proteinuria, she has low anti-thrombin levels, which contributes to the venous thrombotic risk in these patients.

A	Factor V Leiden

Factor V Leiden is incorrect. Factor V Leiden would not have a link with the nephrotic range proteinuria.

C	Reduced concentration of von Willebrand factor

Reduced concentration of von Willebrand factor is incorrect.

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A 61-year-old woman presents with a pulmonary embolus and you wish to begin warfarin therapy. She has multiple medical problems including ischaemic cardiovascular disease, diabetes, mixed connective tissue disease and epilepsy.

Which of the following medications that she takes is most likely to reduce the effect of warfarin?

A	Azathioprine
B	Glibenclamide
C	Lamotrigine
D	Metformin
E	Ramipril

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Previous Question | Skip Question

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Explanation

A	Azathioprine

Azathioprine is the most likely medication that will reduce the effect of warfarin. Themechanism of how this occurs isnot widely described. Other agents, such as carbamazepineand oral contraceptives induce the P450 enzyme, increasing the metabolism of the warfarin.

C	Lamotrigine

Lamotrigine is incorrect. Lamotrigine is an anti-convulsant. The metabolism of warfarin is accelerated by carbamazepine and primidone, as well as phenytoin. The anticoagulant effect of warfarin is possibly enhanced by sodium valproate, but warfarin metabolism is not affected by lamotrigine.

B	Glibenclamide

Glibenclamide is incorrect. Glibenclamide, an anti-diabetic medication does not affect the metabolism of the warfarin.

D	Metformin

Metformin is incorrect. The anti-diabetic drug metformin does not have an effect on warfarin metabolism.

E	Ramipril

Ramipril is incorrect. The ACE inhibitor ramipril does not affect the metabolism of warfarin.

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In cancer therapy, what is the rationale behind using combinations of chemotherapeutic agents rather than single agents?

A	Combination therapy can be given over a shorter period of time
B	Combination therapy decreases the chances of drug resistance developing
C	Combination therapy is less likely to result in long-term toxicity
D	Fewer side-effects occur in combination therapy
E	Metastases are less common in combination therapy

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Previous Question Skip Question

Calculator

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Explanation

B	Combination therapy decreases the chances of drug resistance developing

There are two main reasons for using combinations of different chemotherapy agents. Different drugs will exert their effects through different mechanisms, so combining them will increase the number of tumour cells killed in each cycle. It also reduces the chances therefore of drug resistance developing.

D	Fewer side-effects occur in combination therapy

Fewer side-effects occur in combination therapy is incorrect because there may be more side effects with combination chemotherapy because more drugs are being used.

A	Combination therapy can be given over a shorter period of time

Combination therapy can be given over a shorter period of time is incorrect because combination chemotherapy often requires the drugs to be given over a number of different days, rather than single agent treatment.

C	Combination therapy is less likely to result in long-term toxicity

Combination therapy is less likely to result in long-term toxicity is incorrect, because the use of more than one drug may result in increased long-term toxicity because of the numbers of drugs being used.

E	Metastases are less common in combination therapy

Metastases are less common in combination therapy is incorrect.

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8:18

A 58-year-old man presents with tiredness, easy bruising, night sweats and weight loss.

Investigations:

Hb	89 g/l
WCC	22.1 x 10^9/l (circulating blasts seen)
PLT	72 x 10^9/l
Na^+	139 mmol/l
K^+	5.3 mmol/l
Creatinine	155 µmol/l
Bone marrow aspiration	32% blasts

Which one of the following genetic abnormalities is associated with the worst prognosis?

A	Chromosome 7 abnormalities
B	inv 16
C	t(8;21)
D	t(15;17)
E	t(16;16)

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Explanation

A	Chromosome 7 abnormalities

Chromosome 7 abnormalities are associated with the worst prognosis in this question. They are associated with a lower rate of complete remission, with a higher rate of relapsein acute myeloid leukaemia.

B	inv 16

inv 16 is incorrect. Inversion 16 is a sub-type of core binding factor leukaemia that is associated with a goodprognosis.

C	t(8;21)

t(8:21) is incorrect. t(8:21) is another form of core binding factor leukaemia, again associated with a good overallprognosis in acute myeloid leukaemia.

D	t(15;17)

t(15:17) is incorrect. t(15:17) is the typical translocation found in acute promyelocytic leukaemia. This is associated with an excellent overall prognosis.

E	t(16;16)

t(16:16) is incorrect. t(16:16) is a form of core binding factor leukaemia associated with chromosome 16 abnormalities. This again is associated with a good overall prognosis.

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You are considering prescribing an antiemetic for a 38-year-old woman undergoing cancer chemotherapy with a highly emetogenic cytotoxic regimen. Numerous antiemetics are utilised in the management of chemotherapy-induced nausea and vomiting.

Which one of the following antiemetics acts via the neurokinin-1 receptor?

A	Aprepitant
B	Domperidone
C	Hyoscine
D	Metoclopramide
E	Ondansetron

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Previous Question | Skip Question

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E Ondansetron

Explanation

A Aprepitant

Aprepitant acts via the nk-1 receptor. It is a member of the class of drugs that leads to inhibition of substance P. It is indicated for the treatment of chemotherapy-related nausea and vomiting.

B Domperidone

Domperidone is incorrect. Domperidone is a dopamine receptor antagonist, used routinely in the treatment of chemotherapy-related nausea and vomiting, including in the management of moderately emetogenic regimens.

C Hyoscine

Hyoscine is incorrect. Hyoscine is a competitive muscarinic antagonist. It is indicated in the management of motion sickness.

D Metoclopramide

Metoclopramide is incorrect. Metoclopramide is a dopamine receptor antagonist, used routinely in the treatment of chemotherapy-related nausea and vomiting, including in the management of moderately emetogenic regimens.

E Ondansetron

Ondansetron is incorrect. Ondansetron acts via the 5-HT pathway and is routinely used in the treatment of chemotherapy-related nausea and vomiting, in the management of mo ly and highly emetogenic regimens.

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An elderly man with a right iliofemoral DVT is treated with heparin, but later returns with a painful, white, ischaemic foot. Investigations initially show: Hb normal, Plt 20, WCC normal, APTT 24.6. On day 7,Hb dropped from 16 to 14 with reduced platelet count.

Which one of the following is the most appropriate treatment?

A	Give blood
B	Hirudin
C	Low-molecular-weight heparin
D	Platelet transfusion
E	Stop heparin

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Previous Question | Skip Question

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8:21
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Explanation

E	Stop heparin

Stopping heparin is the most appropriate management step. This man presented with a venous thrombotic event and is treated with heparin. He later returns with a painful, white,ischaemic foot. This now suggests he has an arterial thrombosis. This, associated with a thrombocytopaenia, suggests the development of heparin-induced thrombocytopaenia. The most important management step is to stop heparin, and then institute an alternative anticoagulant.

A	Give blood

Give blood is incorrect. Giving blood is not the next most appropriate step. The most important management step is to stop the heparin immediately and institute an alternative anticoagulant.

B	Hirudin

Hirudin is incorrect. Hirudin is not widely available. The institution of an alternative anticoagulant such as argatroban or fondaparinux would be appropriate while undertaking further investigations.

C	Low-molecular-weight heparin

Low-molecular-weight heparin is incorrect. There is cross-reactivity with unfractionated heparin, and indeed low-molecular-weight heparin in its own right can cause heparin-induced thrombocytopaenia. This is not an appropriate alternative to intravenous heparin in this situation.

D	Platelet transfusion

Platelet transfusion is incorrect. Platelet transfusions are relatively

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A 17-year-old girl from Nigeria who recently immigrated to England has been referred by her GP because she looks anaemic. On examination you notice frontal bossing of the skull and chronic leg ulcers. Her Hb is 70 g/l (120-160 g/l) and Howell-Jolly bodies are seen.

Which one of the following is the most likely diagnosis?

A	Acute lymphocytic leukaemia
B	Aplastic anaemia
C	Myeloma
D	Sickle-cell disease
E	Thalassaemia

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ulcers. Her Hb is 70 g/l (120–160 g/l) and Howell–Jolly bodies are seen.

Which one of the following is the most likely diagnosis?

Your answer was correct

A	Acute lymphocytic leukaemia
B	Aplastic anaemia
C	Myeloma
D	Sickle-cell disease
E	Thalassaemia

Explanation

D	Sickle-cell disease

We are told that the girl is anaemic with Howell–Jolly bodies seen on the peripheral blood film. Howell–Jolly bodies are a sign of hyposplenism, which is found in children and adolescents with sickle-cell anaemia. The sickle cells cause splenic infarction, which results in a hyposplenic state. Leg ulcers are also associated with sickle-cell disease.

A	Acute lymphocytic leukaemia

Acute lymphocytic leukaemia is incorrect. Acute lymphoblastic leukaemia is certainly possible in a 15-year-old patient, but again causes a pancytopenic state, or blasts in the peripheral blood. Again there are no particular associations with one ethnic group.

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Again there are no particular associations with one ethnic group.

B Aplastic anaemia

Aplastic anaemia is incorrect. Aplastic anaemia has no particular ethnic association. This is usually associated with a pancytopenic state, and acquired aplastic anaemia is rare in 15-year-old patients. This would not be associated with Howell-Jolly bodies in the peripheral blood.

C Myeloma

Myeloma is incorrect. Myeloma is extremely rare in this age group. Again it would not cause a hyposplenic state.

E Thalassaemia

Thalassaemia is incorrect. This usually does not result in a hyposplenic state, and therefore it would be unusual to see Howell-Jolly bodies in the peripheral blood.

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8:22
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A 40-year-old man presents with acute weakness and palpitations. He has a history of diarrhoea and weight loss over the past few months and he is opening his bowels up to 6 times per day. Investigations reveal (normal range in brackets):

Sodium	143 mmol/l (137–144)
Potassium	5.0 mmol/l (3.5–4.9)
Urea	15 mmol/l (2.5–7.5)
Creatinine	195 µmol/l (60–110)
Bicarbonate	15 mmol/l (20–29)
Haemoglobin	9.0 g/dl (13.5-18)
Mean cell volume (MCV)	122 fl (80–96)
White cell count	3.2×10^9/l (4–11)
Platelet count	185×10^9/l (150–400)
ESR	45 mm/1st hour
Anti-endomyseal antibodies	Positive

Which one of the following is the most likely explanation for the clinical picture and blood results seen here?

A	Alcoholic liver disease
B	Aplastic anaemia
C	Folic acid deficiency
D	Hypothyroidism

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E Vitamin C deficiency

Explanation

C Folic acid deficiency

This man has a macrocytic anaemia with a slightly low white cell count. Anti-endomysial antibodies are positive, indicating coeliac disease. He also has symptoms of malabsorption, namely diarrhoea and weight loss. The renal impairment is because of fluid loss and subsequent dehydration.

A Alcoholic liver disease

Alcoholic liver disease is incorrect. The liver function tests are not even mentioned in this question and there is nothing in the question to suggest excessive alcohol intake.

B Aplastic anaemia

Aplastic anaemia is incorrect. Aplastic anaemia would usually cause a pancytopenia with a very significant reduction in the platelet count.

D Hypothyroidism

Hypothyroidism is incorrect. We are given no indication of thyroid results here and hypothyroidism would not be associated with coeliac disease.

E Vitamin C deficiency

Vitamin C deficiency is incorrect. Vitamin C deficiency would not cause such a significant macrocytic anaemia and be associated with coeliac disease.

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A 17-year-old male with homozygous sickle cell anaemia is brought into the Emergency Department. He had complained of chest pain in the previous 48 hours with no cough. He was pyrexial, temperature 38 °C, and shocked and clammy in the extremities. Compliance with his prophylactic medications had been poor recently because of his relocation to live with his grandmother. There was no record of childhood vaccinations.

Which organism is most likely to be causative?

A	*Escherichia coli*
B	Methicillin-resistant *Staphylococcus aureus*
C	*Mycoplasma hominis*
D	*Salmonella* spp.
E	*Streptococcus pneumoniae*

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Previous Question | Skip Question

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Explanation

E	*Streptococcus pneumoniae*

We are told that this is a 17-year-old male who has significant homozygous sickle cell anaemia, who has not been on prophylactic antibiotics such as penicillin. He also has not had his vaccinations. Patients with sickle cell disease are prone to infections within encapsulated organisms because of their asplenic state. These include *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Neisseria meningitidis*. To combat these infections, patients with homozygous sickle cell disease should be on lifelong penicillin and be vaccinated against these organisms.

D	*Salmonella* spp.

Salmonella spp. is incorrect. *Salmonella* is not one of the encapsulated organisms that are particularly associated with an asplenic state.

A	*Escherichia coli*

Escherichia col is incorrect. *E.coli* is false because this is not one of the encapsulated organisms that are particularly associated with an asplenic state.

B	Methicillin-resistant *Staphylococcus aureus*

Methicillin-resistant *Staphylococcus aureus* (MRSA) is incorrect. MRSA is not one of the encapsulated organisms that are particularly associated with an asplenic state.

C	*Mycoplasma hominis*

Mycoplasma hominis is incorrect. *M. hominis* is ticularly associated with the asplenic state of ho le cell

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A 71-year-old man is taking long-term warfarin therapy for a mechanical aortic valve. His dose is usually stable but he has presented acutely to the Emergency Department with increasing shortness of breath and fatigue over the past 36 h, coupled with melaena and extensive bruising. His BP on admission is 90/50 mmHg, with pulse 110/min. He passes approximately 300 ml of liquid melaena mixed with fresh blood soon after you have finished examining him. He is given 3000 U of prothrombin complex concentrate (PCC).

What other intervention is appropriate in this situation?

A	1 mg IV vitamin K
B	5 mg IV vitamin K
C	Fresh frozen plasma
D	IV heparin
E	Low-molecular-weight heparin

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Previous Question | Skip Question

Calculator

Normal Values

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B	5 mg IV vitamin K

This man has life-threatening gastro-intestinal bleeding and has been given prothrombin complex concentrate to reverse his long-term warfarin therapy. This is entirely appropriate. However, prothrombin complexconcentrate has a short half-life. If vitamin K is not given to reverse the anti-coagulanteffect of warfarin on coagulation factor production within the liver, the INR will rise once again after the prothrombin complex concentrate has been degraded within the circulation.

Although this man has an aortic valve replacement, he is critically unwell with major bleeding, and he therefore needs a large dose of intravenous vitamin K to inhibit the effect of warfarin on coagulation factor production within the liver.

A	1 mg IV vitamin K

1mg IV vitamin K is incorrect. 1 mg IV vitamin K is insufficient in this situation. This is sometimes used to reduce a raised INR in an asymptomatic patient, which is not the case in this situation.

C	Fresh frozen plasma

Fresh frozen plasma (FFP) is incorrect. Fresh frozen plasma is no longer used to reverse warfarin in the context of life-threatening bleeding, and all hospitals should administer prothrombin complex concentrate accompanied by vitamin K.

D	IV heparin

IV heparin is incorrect. IV heparin is clearly false. This man is critically unwell with bleeding, and IV heparin will only make this worse.

E	Low-molecular-weight heparin

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8:28
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A 30-year-old man with neurofibromatosis type 2 is under surveillance for the development of intracranial malignancy.

Which nervous system tumour typically manifests bilaterally in patients with neurofibromatosis type 2?

A	Acoustic neuroma
B	Capillary haemangioma
C	Ependymoma of the ventricles
D	Giant-cell astrocytoma
E	Medulloblastoma

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Previous Question | Skip Question

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A 30-year-old man with neurofibromatosis type 2 is under surveillance for the development of intracranial malignancy.

Which nervous system tumour typically manifests bilaterally in patients with neurofibromatosis type 2?

Your answer was correct

A	Acoustic neuroma
B	Capillary haemangioma
C	Ependymoma of the ventricles
D	Giant-cell astrocytoma
E	Medulloblastoma

Explanation

A	Acoustic neuroma

The gene for neurofibromatosis type 2 (central neurofibromatosis) has been mapped to chromosome 22q12.2. This disorder is characterised by bilateral acoustic neuromas, but tumours may occur on other cranial nerves or spinal roots and also paraspinally. Meningiomas and gliomas may also develop. A further feature is the occurrence of juvenile posterior subcapsular lenticular opacities.

B	Capillary haemangioma

Capillary haemangioma is incorrect. Capillary h gioma is a

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A 25-year-old woman noticed one episode of passing blood instead of urine. Her GP arranged for a urological examination, which proved to be normal. She looks anaemic, but examination is otherwise normal. Blood tests confirm anaemia with a white blood cell count and platelets in the normal range.

Which one of the following is the most likely diagnosis?

A	Acute lymphocytic anaemia
B	Aplastic anaemia
C	Fanconi anaemia
D	Glucose-6-phosphate dehydrogenase deficiency
E	Paroxysmal nocturnal haemoglobinuria

43705

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Previous Question | Skip Question

Calculator

Normal Values

Annotation | Stop Share

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venous thrombosis and can be associated with aplastic anaemia.

A	Acute lymphocytic anaemia

Acute lymphocytic leukaemia is incorrect. Acute lymphoblastic leukaemia will often cause a pancytopenia, or a very raised white cell count. Once again it would not account for the episode of passing 'blood'.

B	Aplastic anaemia

Aplastic anaemia is incorrect. This would account for anaemia, and is associated with PNH. However, it would not account for the episode of passing 'blood' instead of urine.

C	Fanconi anaemia

Fanconi anaemia is incorrect. Fanconi anaemia is a congenital form of aplastic anaemia. Again this is false for the reasons given for acquired aplastic anaemia. Furthermore, Fanconi anaemia can be associated with other congenital abnormalities, including skeletal defects, abnormalities of the renal tract or skin, with short stature. We are told examination is otherwise normal.

D	Glucose-6-phosphate dehydrogenase deficiency

Glucose-6-phosphate dehydrogenase deficiency is incorrect. Glucose phosphate dehydrogenase deficiency causes episodic haemolytic anaemia, but again would not account for the episode of passing 'blood'.

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7:36

A 65-year-old smoker recently underwent radiotherapy for an inoperable lung carcinoma. He presents to the Emergency Department because his carer noticed significant bruising and bleeding, which she could not stop, after she was shaving him that morning. On examination he is cachectic and jaundiced. The following laboratory results are obtained. Hb, WCC normal and MCV elevated, thrombocytes 33 × 10^9/litre, PT, APTT and bleeding time prolonged, fibrinogen levels decreased.

Which one of the following is the most likely cause for this patient's bleeding tendency?

A	Liver metastases
B	Fibrin deficiency
C	Disseminated intravascular coagulation
D	Warfarin overdose
E	Bone metastases

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Previous Question Skip Question

Calculator

Normal Values

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Explanation

C	Disseminated intravascular coagulation

This man has advanced lung cancer. He has thrombocytopenia, evidence of a prolonged PT, APTT, as well as reduced fibrinogen levels. The fact that he has an advanced malignancy, low platelets and prolonged coagulation times with a low serum fibrinogen all suggests underlying disseminated intravascular coagulation secondary to his lung carcinoma.

A	Liver metastases

Liver metastases is incorrect. Although liver metastases may have some effect on coagulation factor production, this would not really explain the very low platelet count at 33 x 10^9/litre.

B	Fibrin deficiency

Fibrin deficiency is incorrect because it clearly has nothing to do with the fact that this man has an inoperable lung carcinoma. Primary fibrin deficiency is extremely rare and again would not explain the low platelet count.

D	Warfarin overdose

Warfarin overdose is incorrect. There is nothing to suggest that this man is on warfarin! It would cause a definite prolongation of the PT, a lesser prolongation of the APTT, but would not normally affect fibrinogen levels or platelet count.

E	Bone metastases

Bony m ses is incorrect. This would not explain prolonged arameters and the decreased fibrinogen.

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7:37
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A 38-year-old woman is referred to the Haematology Outpatients department by her GP with anaemia. Her Crohn's disease has recently flared up after a prolonged course of non-steroidal anti-inflammatory drugs (NSAIDs) prescribed for her painful lower back. She has never had abdominal surgery. Her results show Hb 8.3 g/dl, MCV 101 fl, WCC 8 × 103/mm^3, platelets 480 × 103/mm^3, bilirubin 39 µmol/litre, lactate dehydrogenase (LDH) 378 U/litre, normal renal and liver function, her red cell folate level is low, as is her serum vitamin B12.

What is the most likely cause of her anaemia?

A	NSAID-induced gastritis
B	Anaemia of chronic disease
C	Pernicious anaemia
D	Dietary deficiency of vitamin B12 and folate
E	Terminal ileal disease

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Annotation
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Explanation

E	Terminal ileal disease

We have been told that this lady has Crohn's disease that has recently flared up and this will explain a low serum B12 level. As outlined below, B12 is necessary for normal folate metabolism, and therefore when there is a primary B12 deficiency, one can see a low red cell folate as a consequence.

C	Pernicious anaemia

Pernicious anaemia is incorrect – this is due to an auto-immune destruction of the gastric mucosa leading to absent secretion of intrinsic factor. This leads to a reduction in B12 levels. B12 is an important co-factor in folate metabolism, so a reduced B12 level would explain also a low red cell folate level. However, it has been stated that this lady already has a problem that would cause low B12 levels, namely her Crohn's disease. In the exam, it is important to read the question carefully. It is therefore more likely to consider a pre-existing disease such as Crohn's resulting in the low B12 level, rather than bringing in another diagnosis to explain the low B12 levels, such as pernicious anaemia.

A	NSAID-induced gastritis

NSAID-induced gastritis is incorrect - gastric erosions can certainly occur that cause blood loss, but this would not explain the low folate and the low B12 levels.

B	Anaemia of chronic disease

Anaemia of chronic disease is incorrect – the anaemia of chronic disease can give a microcytic anaemia, but equally well it can give a normo[illegible]d even a macrocytic anaemia. Again though, the anaemia of chronic disease would not normally explain low folate

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A 20-year-old woman student attends the blood transfusion service wishing to donate blood. She is currently well, has never had a serious illness and weighs 60 kg. About 6 months ago she spent the summer doing voluntary work in Nigeria. She also had her ears pierced 3 years ago and had a tattoo put on her left arm 2 years ago. She is not acceptable as a donor.

What is the reason for her rejection for blood donation in the UK?

A	Body piercing
B	Travel to an endemic area
C	Tattoo
D	Age
E	Underweight

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B Travel to an endemic area

The reasons for rejection for blood donation in the UK can be found on the National Blood Service website. This young lady will not be accepted as a potential blood donor until at least 6 months after her return to the UK. This is because Nigeria is an endemic area for malaria.

C Tattoo

Tattoo is incorrect. This occurred 2 years ago.

A Body piercing

Body piercing is incorrect. Her ears were pierced 3 years ago. National Blood Service guidelines would allow her to be a donor if she had had a tattoo or any skin piercings longer than 4months ago.

D Age

Age is incorrect. Patients between the ages of 17 and 66 can donate blood, so the fact that she is 20 should not be a contraindication to her being a donor.

E Underweight

Underweight is incorrect. As long as potential donors weigh greater than 50 kg, they can be considered as a donor. She weighs 60 kg, so this should not be a contraindication to her donation.

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An 18-year-old woman is referred to the Haematology Outpatients Department by the gynaecologists, who cannot find a structural or hormonal cause for her severe menorrhagia. Clinical examination is unremarkable apart from her pallor, and she is on no medication. A full blood count shows:

Hb 8.4 g/litre; MCV 71 fl; RDW 21%; WCC 7.2 × 10^3/mm^3; platelets 501 × 10^3/mm^3. Her liver function and renal function are normal, as is her prothrombin time.

Which investigation is most likely to reveal the underlying disorder?

A	Factor VIII:C level
B	Bone marrow aspirate
C	Serum ferritin
D	Activated partial thromboplastin time
E	Von Willebrand factor level

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E	Von Willebrand factor level

This is because the Royal College want you to be thinking that this is underlying Von Willebrand's disease. This young lady has a microcytic anaemia which is likely to be iron deficient as a result of her heavy periods. There is a reactive thrombocytosis. The question is trying to find out what the underlying cause is, which is most likely to be Von Willebrand's disease.

A	Factor VIII:C level

Factor VIII level is incorrect Factor VIII level will not be the most reliable investigation. This cannot be haemophilia, as this only affects male patients. It is also possible that the Royal College did not want you to think that this could in any way be haemophilia, so that is why the answer is false.

B	Bone marrow aspirate

A bone marrow aspirate is incorrect. A bone marrow aspirate is clearly far too excessive and invasive. Also, it will not get to the answer of what the underlying coagulation disorder is.

C	Serum ferritin

Serum ferritin is incorrect - serum ferritin will not help in any way. It will clearly be low, as a result of the menorrhagia, and again will not help in the diagnosis of the underlying congenital bleeding disorder.

D	Activated partial thromboplastin time

Activated partial thromboplastin time is incorrect. Activated partial thromboplastin is too insensitive. It is commonly normal in patients with v brand's disease. Even if it was raised, it still does not take you further forward in diagnosing an underlying congenital

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D Activated partial thromboplastin time

Activated partial thromboplastin time is incorrect. Activated partial thromboplastin is too insensitive. It is commonly normal in patients with von Willebrand's disease. Even if it was raised, it still does not take you further forward in diagnosing an underlying congenital bleeding disorder.

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An 82-year-old man is reviewed in a medical clinic for weight loss and headaches. He has had trouble reading and there are no other neurological symptoms. He is an ex-smoker and has cardiac failure controlled with furosemide (frusemide) and captopril. On examination, he has axillary lymphadenopathy and splenomegaly. FBC shows Hb 10.1 g/dl, WCC 6.2 × $10^3/mm^3$, platelets 118 × $10^3/mm^3$, ESR 98, and his renal and bone profiles are normal.

Which one of the following is the likely diagnosis?

A	Multiple myeloma
B	Temporal arteritis
C	Hodgkin's lymphoma
D	Lymphoplasmacytoid lymphoma
E	Systemic lupus erythematosus

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Previous Question | Skip Question

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7:47
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D	Lymphoplasmacytoid lymphoma

This man is anaemic, thrombocytopenic, has axillary lymph nodes and an enlarged spleen. He also has weight loss and headaches. This suggests a lymphoproliferative disorder. The headaches might suggest a raised plasma viscosity. Lymphoplasmacytic lymphoma, also known as Waldenstrom's macroglobulinaemia, is the correct answer. It is due to a low-grade lymphoma that secretes IgM. This can cause hyperviscosity syndrome, as well as the lymphadenopathy.

A	Multiple myeloma

Multiple myeloma is incorrect. There is nothing to suggest that there are problems with his immunoglobulins, and he has normal renal and bone function. Also, axillary lymphadenopathy and splenomegaly are not normally found in multiple myeloma.

B	Temporal arteritis

Temporal arteritis is incorrect. Temporal arteritis would not explain the lymphadenopathy and splenomegaly.

C	Hodgkin's lymphoma

Hodgkin's lymphoma is incorrect. Hodgkin's lymphoma is actually quite rare in the elderly and one would look for a more relevant answer. Furthermore, Hodgkin's lymphoma is not associated with hyperviscosity syndrome.

E	Systemic lupus erythematosus

Systemic lupus erythematosus (SLE) is incorrect. SLE would not give widespread lymphadenopathy in combination with a hyperv syndrome.

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7:48
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A 37-year-old man has a lump in his testicle, a mass on chest X-ray and a raised β-HCG.

Which one of the following would be the most appropriate next step in his management?

A	CT-guided biopsy of the chest lesion
B	Orchidectomy
C	Staging computed tomography (CT) scan
D	Testicular biopsy
E	Testicular ultrasound

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Previous Question | Skip Question

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C	Staging computed tomography (CT) scan

The triad of a testicular lump, a mass on chest X-ray and a raised β-HCG (human chorionic gonadotrophin) are suggestive of testicular seminoma. A raised β-HCG is found in around 15% of seminomas and may be a useful correlate with response to treatment. 'Pure' seminoma will not be associated with a raised α-fetoprotein, unlike non-seminomatous germ-cell tumours. A raised β-HCG never occurs in a normal male and is diagnostic of malignancy.

After diagnosis of testicular cancer, a staging CT scan is required to assess the extent of disease and provide a baseline for response to treatment.

A	CT-guided biopsy of the chest lesion

CT-guided biopsy of the chest lesion is incorrect. CT-guided biopsy of the chest lesion is not necessary as the tissue diagnosis will be made at orchidectomy.

B	Orchidectomy

Orchidectomy is incorrect. Orchidectomy will be performed, but is not the appropriate next stage, as completion of staging takes priority. Orchidectomy with chemotherapy is curative in 90% of cases.

D	Testicular biopsy

Testicular biopsy is incorrect. Testicular biopsy is contraindicated owing to the risk of seeding the malignancy to the skin.

E	Testicular ultrasound

Testicular ultrasound is incorrect. Testicular ultrasound is not likely to alter the patient's management in this case and would be used in

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A young Vietnamese woman has been unwell for a few days with a sore throat and a dry cough. She presents to her general practitioner who carries out a full blood count. Investigations:

Hb	12.5 g/dl
WBC	19 x 10^9/l
Neutrophil	14 x 10^9/l
PLT	498 x 10^9/l

Which one of the following is the most likely diagnosis?

A Acute bacterial infection

B Chronic myeloid leukaemia

C Cytomegalovirus infection

D Pregnancy

E Tuberculosis

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Previous Question Skip Question

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Explanation

A	Acute bacterial infection

Acute bacterial infection is the most likely diagnosis. This lady has leucocytosis, which is predominantly a neutrophilia. This would therefore be associated with an acute bacterial infection.

B	Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. The white cell count is usually far, far greater than 19.

C	Cytomegalovirus infection

Cytomegalovirus infection is incorrect. Cytomegalovirus infection may result in a mononucleosis picture, with lymphocytosis and atypical forms. Here there is a neutrophilia.

D	Pregnancy

Pregnancy is incorrect. Although pregnancy can be a cause of a neutrophilia, there is nothing in the question to suggest that this might be the case and she does have clinical symptoms of a respiratory tract infection that would be a more obvious answer.

E	Tuberculosis

Tuberculosis is incorrect. Tuberculosis would not be expected to cause a neutrophilia and the duration is only a couple of days.

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A 64-year-old man with a long history of smoking presents to the Emergency Department following a fracture of his left humerus associated with a very minor twisting injury. On reviewing the films with the on-call radiographer you are concerned about a lytic lesion possibly being related to the fracture.

Which one of the following primary tumours is this patient likely to have?

A	Bronchial carcinoma
B	Colorectal carcinoma
C	Gastric carcinoma
D	Renal carcinoma
E	Thyroid carcinoma

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7:53
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A Bronchial carcinoma

The most common tumours causing bone metastasis include: bronchial carcinoma, breast carcinoma and prostatic carcinoma. Metastases to bone also typically occur from renal or thyroid carcinomas, but as these tumours are less common, bony metastases of these origins are less often seen. Colorectal and gastric carcinomas may metastasise to bone, but more commonly involve viscera such as liver or lungs.

Primary bone tumours (such as osteosarcomas, fibrosarcomas and chondromas) are rare and usually only seen in children and young adults.

Symptoms are usually related to the primary tumour site, with local bone pain unless patients present with a pathological fracture as in this case. X-ray examination reveals osteolytic areas and local bony destruction. Osteosclerotic metastases are characteristic of prostatic carcinoma.

B Colorectal carcinoma

Colorectal carcinoma is incorrect. Colorectal carcinomas may metastasise to bone, but more commonly involve viscera such as liver or lungs.

C Gastric carcinoma

Gastric carcinoma is incorrect. Gastric carcinomas may metastasise to bone, but more commonly involve viscera such as liver or lungs.

D Renal carcinoma

Renal carcinoma is incorrect. Although renal carcinoma may metastasise to bone, as it is less common than bronchial cancer it is not the most likely cause here.

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E Thyroid carcinoma

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What is mycosis fungoides?

A	Cutaneous T-cell lymphoma
B	Cutaneous B-cell lymphoma
C	A lymphoid reaction to insect bites
D	A fungus sepsis due to immunodeficiency
E	A graft versus host reaction

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Previous Question | Skip Question

Calculator

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A Cutaneous T-cell lymphoma

It is an indolent lymphoma of mature T-cells predominantly involving the skin. The patient may have circulating abnormal T-cells called Sézary cells. If this is associated with erythroderma, they are said to have the Sézary syndrome. They can present with severe pruritus and psoriasis-like lesions. Ultimately deeper organs are affected, particularly lymph nodes, spleen, liver and bone marrow. Chemotherapy may be needed.

B Cutaneous B-cell lymphoma

Cutaneous B-cell lymphoma is incorrect, mycosis fungoides is a cutaneous T-cell lymphoma.

C A lymphoid reaction to insect bites

A lymphoid reaction to insect bites is incorrect, mycosis fungoides is a cutaneous T-cell lymphoma.

D A fungus sepsis due to immunodeficiency

A fungus sepsis due to immuno-deficiency is incorrect, mycosis fungoides is a cutaneous T-cell lymphoma.

E A graft versus host reaction

Graft versus host reaction is incorrect, mycosis fungoides is a cutaneous T-cell lymphoma.

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A woman is found to have ilio-femoral thrombosis during her pregnancy. Her mother had deep vein thrombosis (DVT) as well when she was pregnant. Her thrombophilia screen is normal.

She is started on low molecular weight heparin for this pregnancy, which one of the following should be done for the future?

A	Repeat thrombophilia screen in 1 month
B	Screen her sister for thrombophilia
C	She may be reassured that the risks of DVT in subsequent pregnancies is low
D	She should be advised that she has a thrombotic state
E	Start low molecular weight heparin for subsequent pregnancy

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Previous Question | Skip Question

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E	Start low molecular weight heparin for subsequent pregnancy

Starting low molecular weight heparin for a subsequent pregnancy makes sense, because this woman has developed an above the knee DVT during the current pregnancy.

A	Repeat thrombophilia screen in 1 month

Repeat thrombophilia screen in 1 month is incorrect. This will not change the clinical decision that this lady needs anticoagulation during this pregnancy and for future pregnancies.

B	Screen her sister for thrombophilia

Screen her sister for thrombophilia is incorrect. Screening her sister for thrombophilia will not help. Thrombophilia screens are only helpful if there is an index case for the thrombophilic disorder that can be tracked throughout the family. The woman in the question has a normal thrombophilia screen.

C	She may be reassured that the risks of DVT in subsequent pregnancies is low

She may be reassured that the risks of DVT in subsequent pregnancies is low is incorrect. She has developed a DVT during the current pregnancy, and therefore should receive prophylaxis in future pregnancies on clinical risk alone.

D	She should be advised that she has a thrombotic state

She should be advised that she has a thrombotic state is incorrect. She is pro-thrombotic because of her pregnancy, which hopefully should r… when the pregnancy ends.

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A 32-year-old woman presents with a 3-month history of tiredness, shortness of breath and rash. She admits to passing dark urine but denies any other urinary symptoms. There is no previous medical history of note other than a 6-month course of oral anticoagulants for a spontaneous deep vein thrombosis (DVT) 2 years previously. On examination she has a petechial rash around her ankles and some bruises on her forearms. The full blood count demonstrates haemoglobin 61 g/l, white blood cell count 1.2 × 10^9/l, platelets 10 × 10^9/l, mean cell volume 105 fl and reticulocytes 4%. Dipstick analysis of the urine was positive for 'blood', but the microscopy showed no red cells.

Which one of the following is the most likely diagnosis?

A	Acute myeloid leukaemia
B	Aplastic anaemia
C	Megaloblastic anaemia
D	Paroxysmal nocturnal haemoglobinuria
E	Systemic lupus erythematosus

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D	Paroxysmal nocturnal haemoglobinuria

The combination of thromboembolic events with a pancytopenia blood picture does suggest this rare diagnosis. In particular, dipstick analysis of the urine was positive for 'blood', but the microscopy showed no red blood cells. This final statement is because there is intravascular haemolysis, with intravascular release of haemoglobin. This then passes through the renal tubules, ending up in the urine, and turning the dipstick analysis positive. However, because there are no actual red blood cells in the urine, the microscopy is negative.

A	Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. Acute myeloid leukaemia can cause a pancytopenic state but does not have an association with previous thrombotic events and would not give a positive dipstick for blood.

B	Aplastic anaemia

Aplastic anaemia is incorrect. Aplastic anaemia once again can cause a pancytopenic state, but the combination of thrombotic events, and the pancytopenia, suggest PNH.

C	Megaloblastic anaemia

Megaloblastic anaemia is incorrect. Megaloblastic anaemia would not result in a low white cell count or platelet count.

E	Systemic lupus erythematosus

Systemic lupus erythematosus is incorrect. Systemic lupus erythematosus would not result in such a profound pancytopenia, and the[illegible]o other clinical features to suggest this disease.

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A 76-year-old man presents to the Haematology Clinic with tiredness and lethargy. He has been identifed by his GP to be anaemic and hypercalcaemic, and has been taking increasing amounts of analgesia for lower back pain. Examination confirms a BP of 142/82 mmHg, pulse is 88/min and regular, he looks pale. There is pain on palpation of the lumbar spine. Investigations:

Hb	9.7 g/dl
WCC	8.1 x 10^9/l
PLT	152 x 10^9/l
Na^+	137 mmol/l
K^+	4.3 mmol/l
Creatinine	137 micromol/l
ESR	81 mm/1st hour
Total protein	78 g/l
Albumin	32 g/l
Calcium	2.91 mmol/l
ALP	181 U/l

Which of the following is the most likely finding on radiological investigation?

A	High-intensity signal on T1 weighted MRI
B	Low-intensity signal on T2 weighted MRI
C	hot spots on isotope bone scan

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ALP	181 U/l

Which of the following is the most likely finding on radiological investigation?

A	High-intensity signal on T1 weighted MRI
B	Low-intensity signal on T2 weighted MRI
C	Multiple hot spots on isotope bone scan
D	Multiple lytic lesions on plain radiography
E	Normal plain radiography

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D	Multiple lytic lesions on plain radiography

This man is anaemic, hypercalcaemic and has lower back pain. Multiple myeloma therefore is to be suspected. Lytic lesions are usually seen on a skeletal survey, including the characteristic 'pepper pot' skull X-ray.

A	High-intensity signal on T1 weighted MRI

High-intensity signal on T1 weighted MRI is incorrect. Lytic lesions show as low-intensity signal on T1 images.

B	Low-intensity signal on T2 weighted MRI

Low-intensity signal on T2 weighted MRI is incorrect. In myeloma, lesions show as high-intensity on T2.

C	Multiple hot spots on isotope bone scan

Multiple hot spots on isotope bone scan is incorrect. Characteristically, the bone scan does not show evidence of increased osteoblastic activity in multiple myeloma, as this condition is usually associated with increased osteoclastic activity.

E	Normal plain radiography

Normal plain radiography is incorrect. Normal plain radiography is possible in myeloma, but the multiple lytic lesions described above are more characteristic.

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A 38-year-old patient is investigated for his anaemia. A bone marrow biopsy shows a reduction of haematopoietic cells and a trephine biopsy shows mainly fatty bone marrow.

Given the likely diagnosis, which one of the following is the most likely complication of this disease?

A	Bleeding
B	Infections
C	Malignancy
D	Rupture of the spleen
E	Thromboses

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Previous Question | Skip Question

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B	Infections

Infections are the most likely complication of aplastic anaemia due to significant neutropenia. This is a life-threatening problem and indeed the severity of aplastic anaemia is judged on the neutrophil count.

A	Bleeding

Bleeding is incorrect. Bleeding can be a significant problem in aplastic anaemia and could even be regarded as a true answer. If left untreated, the platelet count can plunge to less than $10 \times 10^9/l$ and can cause serious bleeding. Prophylactic platelet transfusions are required when the platelet count goes below this level.

C	Malignancy

Malignancy is incorrect. Malignancy is not a likely complication of aplastic anaemia.

D	Rupture of the spleen

Rupture of the spleen is incorrect. Rupture of the spleen does not occur in this condition.

E	Thromboses

Thromboses is incorrect. Thrombosis is not a frequent complication of aplastic anaemia.

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A 48-year-old man with long-standing human immunodeficiency virus (HIV) attends the clinic with a 3-week history of rapidly enlarging lymphadenopathy in the left cervical region measuring 8 × 10 cm.

Current CD4 count	120 × 10^6 per litre
haemoglobin	10.4 g/dl
white blood cell count	3.4 × 10^9 per litre
platelets	115 × 10^9 per litre
thyroid-stimulating hormone (TSH)	normal
lactate dehydrogenase (LDH)	1140

Which one of the following is the most likely diagnosis?

A	Atypical tuberculosis
B	Cytomegalovirus infection
C	High-grade non-Hodgkin's lymphoma
D	Kaposi's sarcoma
E	Thyroid carcinoma

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C High-grade non-Hodgkin's lymphoma

This man with longstanding HIV infection has evidence of a pancytopenia. There are symptoms of lymphoma, with a 3-week history of a rapidly enlarging lymph node mass in the left cervical region. The LDH level is also very significantly elevated. This is an AIDS defining illness.

A Atypical tuberculosis

Atypical tuberculosis is incorrect. Although this can present with rapidly enlarging lymphadenopathy, the LDH is usually not as elevated as the level seen here.

B Cytomegalovirus infection

Cytomegalovirus infection is incorrect. Cytomegalovirus infection in advanced HIV disease usually manifests as retinitis, usually with CD4 counts of less than 50×10^6/l.

D Kaposi's sarcoma

Kaposi's sarcoma is incorrect. This usually manifests as single or multiple papular skin lesions.

E Thyroid carcinoma

Thyroid carcinoma is incorrect. Thyroid carcinoma is entirely false and not related to this man's rapidly enlarging lymph node mass in the left cervical region.

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A 42-year-old woman presents to her GP for review. For some months now she has been feeling lethargic and has noticed abdominal discomfort, which she put down to her blouse being too tight. There have been intermittent fevers, worse over the past few weeks. Her blood count reveals anaemia, with a haemoglobin of 9.8 g/dl (11.5–16.5), her platelet count is low at 87 × 10^9/l ((150–400) × 10^9/l). The oncogene *BCR-ABL* is detected on reverse-transcriptase polymerase chain-reaction testing. Her white cell count is raised at 23 × 10^9/l, with a number of myeloid precursor cells present on examination of the film.

What diagnosis fits best with this clinical picture?

A	Acute lymphocytic leukaemia
B	Acute myeloid leukaemia
C	Chronic lymphocytic leukaemia
D	Chronic myeloid leukaemia
E	Hairy-cell leukaemia

45475

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Previous Question Skip Question

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Explanation

D	Chronic myeloid leukaemia

She has symptoms of the condition such as abdominal discomfort due to splenomegaly. She has a mild anaemia, mild thrombocytopenia with a raised white cell count. This, along with the blood film findings, are typical of CML. Most importantly, the detection of BCR-ABL transcripts is diagnostic of CML.

A	Acute lymphocytic leukaemia

Acute lymphocytic leukaemia (ALL) is incorrect. ALL can be associated with positive BCR-ABL transcripts, because some cases of ALL are associated with the Philadelphia chromosome. However, the clinical features, along with the laboratory findings, are much more typical of CML.

B	Acute myeloid leukaemia

Acute myeloid leukaemia (AML) is incorrect. AML would not give positive BCR-ABL transcripts. It would not be typically associated with splenomegaly, and the blood film would show numerous myeloid blasts.

C	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia (CLL) is incorrect. CLL would not give positive BCR-ABL transcripts and would result in a lymphocytosis.

E	Hairy-cell leukaemia

Hairy cell leukaemia is incorrect. Hairy cell leukaemia is a lympho ative condition that usually results in a pancytopenia. Again, this would not be associated with the presence of BCR-ABL transcripts.

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A 60-year-old man presents with haematuria. Investigations confirm the presence of a bladder carcinoma.

In his occupational history, exposure to which one of the following substances would be a significant risk factor for his current diagnosis?

A	Asbestos
B	Aromatic amines
C	Arsenic
D	Nickel
E	Vinyl chloride

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Previous Question Skip Question

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B	Aromatic amines

Bladder carcinoma is associated with exposure to aromatic amines such as benzidine and beta-naphthylamine, which are sometimes used in the dye industry. Other risk factors include smoking - which is the most common cause and accounts for approximately half of all bladder cancers - and working in the rubber and leather industries.

A	Asbestos

Asbestos is incorrect. Asbestos increases the risk of lung cancer and in particular mesothelioma.

C	Arsenic

Arsenic is incorrect. Arsenic predisposes to skin cancer (squamous- and basal-cell carcinomas).

D	Nickel

Nickel is incorrect. Nickel predisposes to squamous-cell carcinomas of the oral cavity.

E	Vinyl chloride

Vinyl chloride is incorrect. Vinyl chloride is associated with haemangiosarcoma of the liver.

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A 71-year-old man presents with progressively increasing tiredness over the past 7 months. Previously fit and well, he has had to give up riding his bike because of a reduction in his exercise tolerance. He has also suffered two bouts of pneumonia over the past year, intermittent night sweats and gradual weight loss of 7 kg. His BP is 135/72 mmHg, pulse is 80/min and regular, he looks pale. There is no lymphadenopathy. Cardiovascular, respiratory and abdominal systems are unremarkable. Investigations:

Hb	9.0 g/dl
MCV	106 fl
Blood film	Shows dimorphic red cells, Pappenheimer bodies, basophilic stippling
WCC	5.4 x 10^9/l
PLT	88 x 10^9/l
Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	110 micromol/l
Ferritin	160 microg/l
Folate	20 microg/l
B12	140 ng/l

Which of the following is the best investigation to establish the underlying diagnosis?

A Abdominal ultrasound scan

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arrow biopsy plus cytogenetics

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systems are unremarkable. Investigations:

Hb	9.0 g/dl
MCV	106 fl
Blood film	Shows dimorphic red cells, Pappenheimer bodies, basophilic stippling
WCC	5.4 x 10^9/l
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Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	110 micromol/l
Ferritin	160 microg/l
Folate	20 microg/l
B12	140 ng/l

Which of the following is the best investigation to establish the underlying diagnosis?

A	Abdominal ultrasound scan
B	Bone marrow biopsy plus cytogenetics
C	Colonoscopy
D	Peripheral blood cytogenetics
E	Upper GI endoscopy and biopsy

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Explanation

B	Bone marrow biopsy plus cytogenetics

Bone marrow biopsy plus cytogenetics would be the next best investigation to establish theunderlying diagnosis. This man has a macrocytic anaemia. His blood film was abnormal witha dimorphic red cell population, Pappenheimer bodies, along with basophilic stippling. The platelet count is also reduced. The white cell count appears normal. B12 and folate levels are also normal. When a patient has a macrocytic anaemia with normal haematinic levels, especially with an abnormal blood film, the diagnosis of myelodysplasia should be raised. The best way to diagnose this therefore is a bone marrow examination, including looking for cytogenetic abnormalities.

A	Abdominal ultrasound scan

Abdominal ultrasound scan is incorrect. We already know that this man's abdominal examination is unremarkable and this would not help in establishing an underlying diagnosis.

C	Colonoscopy

Colonoscopy is incorrect. There is no evidence of GI blood loss, and his serum ferritin is normal.

D	Peripheral blood cytogenetics

Peripheral blood cytogenetics is incorrect. A morphological diagnosis of myelodysplasia needs to be established, which can only be achieved by a bone marrow examination. Cytogenetic analysis is best done on the bone marrow sample, unless there are numerous circulating blasts, which is not the case in this question.

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A 26-year-old woman who has suffered her third spontaneous abortion is referred by the obstetricians for review. Past history of note includes a deep vein thrombosis that was thought to have been related to a long-haul flight. VDRL testing (used as a syphilis screen) is positive, and IgG anti-cardiolipin antibodies are positive.

What diagnosis fits best with this clinical picture?

A	Antiphospholipid syndrome
B	Protein C deficiency
C	Protein S deficiency
D	SLE
E	Syphilis

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D	SLE
E	Syphilis

Explanation

A	Antiphospholipid syndrome

This lady has features of this condition, such as recurrent miscarriages and a previous deep vein thrombosis. She has positive anti-cardiolipin antibodies.

B	Protein C deficiency

Protein C deficiency is incorrect. Protein C deficiency would not be associated with recurrent miscarriage, and would not cause positive anti-cardiolipin antibodies.

C	Protein S deficiency

Protein S deficiency is incorrect. Protein S deficiency would not be associated with recurrent miscarriage, and would not cause positive anti-cardiolipin antibodies.

D	SLE

SLE is incorrect. SLE can be associated with the anti-phospholipid antibody syndrome, but other features associated with SLE such as a photosensitive rash or arthropathy are absent here.

E	Syphilis

Syphilis is incorrect. There are no other clinical features to suggest this diagnosis. A positive VDRL test is a false positive result that is recognised in the anti-phospholipid syndrome.

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A 17-year-old girl presents with Henoch–Schönlein purpura and renal involvement.

What is the most likely outcome?

A	Complete renal recovery
B	High probability of relapse
C	Persistent hypertension
D	Persistent proteinuria
E	Requirement for long-term corticosteroids

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A 17-year-old girl presents with Henoch–Schönlein purpura and renal involvement.

What is the most likely outcome?

Your answer was correct

A	Complete renal recovery
B	High probability of relapse
C	Persistent hypertension
D	Persistent proteinuria
E	Requirement for long-term corticosteroids

Explanation

A	Complete renal recovery

The most likely outcome here is complete recovery of renal function, and end-stage renal disease only occurs in 5% of patients.

B	High probability of relapse

High probability of relapse is incorrect. High probability of relapse tends to be an isolated event.

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ent hypertension

Persistent hypertension is incorrect. The overall prognosis is

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A 25-year-old man presents to the Respiratory Clinic with recurrent haemoptysis. A well-defined, rounded lesion within the right middle lobe has been identified on chest X-ray arranged by the GP. He smokes five cigarettes per day and has no significant past medical history. Examination reveals a BP of 110/70 mmHg, pulse is 70/min and regular. There are no murmurs on auscultation; there is some wheeze over the right middle lobe. His abdomen is soft and non-tender. Routine bloods including liver function tests are unremarkable.

Given the suspected diagnosis, which of the following blood tests is most likely to be elevated?

A	Alpha fetoprotein
B	CA 19-9
C	Carcino-embryonic antigen
D	Chromogranin A
E	Neuron-specific enolase

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E Neuron-specific enolase

Explanation

D Chromogranin A

The most likely underlying diagnosis, given the history and X-ray findings, is bronchial carcinoid. Out of the options listed, both elevated chromogranin A and neuron-specific enolase are seen in conjunction with carcinoid, although chromogranin A is the more sensitive of the two markers.

A Alpha fetoprotein

Alpha fetoprotein is seen with hepatocellular carcinoma

B CA 19-9

CA 19-9 is seen in pancreatic carcinoma.

C Carcino-embryonic antigen

Carcino-embryonic antigen (CEA) is seen with predominantly right-sided colon cancer, lung and breast cancer.

E Neuron-specific enolase

Although neuron-specific enolase is seen in conjunction with carcinoid, of it and option D it is the less sensitive, making Chromogranin A the better answer.

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A 78-year-old woman presents with dull abdominal pain and lethargy. She has no past history of note apart from hypertension, for which she takes ramipril 10 mg daily, and she has no history of alcohol consumption. On examination her BP is 145/80 mmHg; the most striking finding is 9 cm splenomegaly.

Investigations:

Hb	89 g/l
WCC	28.1 x 10^9/l
PLT	630 x 10^9/l
Na^+	141 mmol/l
K^+	4.9 mmol/l
Creatinine	130 µmol/l

Which other clinical finding is most likely in this case?

A	Ascites
B	Hepatomegaly
C	Inguinal lymphadenopathy
D	Lymphoedema
E	Petechiae/ecchymoses

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E Petechiae/ecchymoses

Petechiae/ecchymosis would be the other most likely clinical finding. This lady has a raised white cell count and raised platelet count, associated with splenomegaly. She is likely to have an underlying myeloproliferative condition, such as myelofibrosis. This can be associated with disordered platelet function, resulting in petechiae or ecchymosis.

D Lymphoedema

Lymphoedema is incorrect. Lymphoedema is not associated with myeloproliferative disorders.

A Ascites

Ascites is incorrect. Ascites is not a common finding in myeloproliferative conditions.

B Hepatomegaly

Hepatomegaly is incorrect. Hepatomegaly can occur in association with myeloproliferative disorders, but it is a more variable sign than petechiae or ecchymosis.

C Inguinal lymphadenopathy

Inguinal lymphadenopathy is incorrect. Inguinal lymphadenopathy would be more likely to be seen in lymphoproliferative disorders.

46353

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8:13
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A 62-year-old woman who had a wide local excision for breast cancer, followed by chemo- and radiotherapy, presents to the haematology clinic with extreme lethargy and easy bruising. She is found to have a diagnosis of acute myeloid leukaemia.

Which one of the following is the most important with respect to indicating a poor prognosis for her?

A	Age >60
B	Female sex
C	Percentage of blast cells in the bone marrow
D	Presence of t(8:21)
E	Presence of t(15:17)

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A	Age >60

It sounds as though this lady now has therapy-related acute myeloid leukaemia following treatment for her breast cancer. Age greater than 60 is a poor prognostic factor, with much lower remission rates and lower long-term survival rates than patients under 60.

B	Female sex

Female sex is incorrect. There is no particular adverse prognostic factor to being female in this situation.

C	Percentage of blast cells in the bone marrow

Percentage of blast cells in the bone marrow is incorrect. We are told that this lady has a diagnosisof acute myeloid leukaemia, meaning that she has at least 20% blasts in the marrow. Having either 20% blasts or a higher figure does not confer an adverse prognosis either way.

D	Presence of t(8:21)

Presence of t(8:21) is incorrect. Presence of t(8,21) would confer a good prognosis.

E	Presence of t(15:17)

Presence of t(15:17) is incorrect. Presence of t(15,17) would confer a diagnosis of therapy-related acute promyelocytic leukaemia. This has a much better prognosis than other chromosomal re-arrangements.

4722

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A 17-year-old, previously well, White girl presented to her general practitioner with tiredness.

The following blood counts were obtained on laboratory testing: haemoglobin 6.8 g/dl, white blood cell count 10 × 10^9/l, platelets 365 × 10^9/l, and mean cell volume (MCV) of 67 fl.

She had been on a paracetamol and codeine compound preparation for menorrhagia and dysmenorrhoea. She eats lots of vegetables, liver, eggs, steak and cereals.

Which one of these causes is playing a significant role in the aetiology of her anaemia?

A	Chronic gastrointestinal (GI) blood loss
B	Having 12 cups of tea and other binders in her diet
C	Heavy and irregular periods
D	Infestation with hookworm
E	Poor diet with foods not rich in iron

C Heavy and irregular periods

Heavy and irregular periods are the most likely significant aetiology of her anaemia. She has amicrocytic anaemia with a normal white cell count and platelet count. We are told that she has menorrhagia. Iron balance in young women is often very borderline, and in the presence of heavy periods, can result easily in iron deficiency, despite a good diet.

A Chronic gastrointestinal (GI) blood loss

Chronic gastrointestinal (GI) blood loss is incorrect. There is no suggestion of 'red flags' for GI blood loss, and there is a more obvious answer in the heavy periods. Chronic GI blood loss would also be unlikely in a teenage woman, and there is no mention of her taking NSAIDs which might predispose to GI blood loss.

B Having 12 cups of tea and other binders in her diet

Having 12 cups of tea and other binders in her diet is incorrect. Phytates and other binders in certain foods, such as tea, can compete with iron absorption in the stomach, but the likely contributing factor to her anaemia is the heavy periods.

D Infestation with hookworm

Infestation with hookworm is incorrect. Infestation with hookworm would only occur in deprived areas of the world and is unlikely to be important in this previously well White girl.

E Poor diet with foods not rich in iron

Poor diet with foods not rich in iron is incorrect. We are told that she eats lots of vegetables,liver, eggs, steak and cereals, which are foods rich in iron.

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8:16

A 62-year-old woman presents to the Emergency Department with haematemesis and extensive skin bruising. She has been managed by her GP with trimethoprim for symptoms of a UTI over the past few days. Her BP is 90/60 mmHg, pulse is 95/min and regular. Temperature is 38.6°C. There is extensive bruising and petechial rash over her upper body and she has soiled herself with melaena. The F1 has commenced a normal saline infusion through a large-bore cannula. Investigations:

Hb	7.2 g/dl
WCC	12.1 x 10^9/l
PLT	55 x 10^9/l
Na^+	138 mmol/l
K^+	5.7 mmol/l
Creatinine	188 micromol/l
PT	42.1 s
APTT	72.3 s

Which of the following is the most appropriate next step?

A	4 units of packed cells
B	Fresh frozen plasma
C	IV antibiotics
D	Platelet transfusion
E	Pr bin complex concentrate

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PLT	55 x 10^9/l
Na^+	138 mmol/l
K^+	5.7 mmol/l
Creatinine	188 micromol/l
PT	42.1 s
APTT	72.3 s

Which of the following is the most appropriate next step?

A 4 units of packed cells

B Fresh frozen plasma

C IV antibiotics

D Platelet transfusion

E Prothrombin complex concentrate

Previous Question | Skip Question

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B	Fresh frozen plasma

Fresh frozen plasma would be the next most appropriate step. This women is febrile andmay well have sepsis from a urinary source. Her coagulation is very disordered, and couldwell be due to disseminated intravascular coagulation (DIC). In this situation, fresh frozen plasma is required, particularly in the presence of bleeding.

A	4 units of packed cells

4 units of packed cells is incorrect. Clearly this would be an appropriate step for someone with active bleeding, although of more urgency is correction of the disordered coagulation.

C	IV antibiotics

IV antibiotics is incorrect. IV antibiotics would be important, but in this situation, control of bleeding with frozen plasma would be the initial treatment of choice.

D	Platelet transfusion

Platelet transfusion is incorrect. The platelet count is 55 x 10^9/l, and platelets would only be given if the platelet count was less than 50 in the presence of active bleeding.

E	Prothrombin complex concentrate

Prothrombin complex concentrate is incorrect. Prothrombin complex concentrate is only given to patients on warfarin who have evidence of life-threatening bleeding.

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8:19

A 54-year-old white man is admitted to the hospital because of abdominal pain and 'black stools'. He has not seen a doctor in years. He smokes two packs of cigarettes daily. Physical exam reveals poor dentition, normal cardiovascular exam and moderate splenomegaly with mild epigastric and left upper quadrant tenderness and a stool test positive for occult blood. Laboratory values reveal haemoglobin of 95 g/l, haematocrit of 29%, white blood cell (WBC) count of 9×10^9/l with a fairly normal differential, a platelet count of 540×10^9/l and a ferritin level of 4 µg/l. Serum vitamin B12 levels are elevated. A bone marrow exam shows hypercellularity without other specific findings and chromosomes are reported as normal. Endoscopy reveals a gastric ulcer and biopsies are negative for malignancy but positive for *Helicobacter pylori* infection.

Appropriate management at this stage should be?

A	Eradication treatment for the *Helicobacter pylori* infection
B	Eradication treatment for the *Helicobacter pylori* infection and iron supplementation for the iron deficiency anaemia
C	Observation
D	Splenectomy
E	Transfusion of two units of packed RBCs

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B	Eradication treatment for the *Helicobacter pylori* infection and iron supplementation for the iron deficiency anaemia

Eradication therapy for helicobacter and iron supplementation for the iron deficiency would be the most appropriate answer. Note that the raised platelet count is a reactive phenomenon.

A	Eradication treatment for the *Helicobacter pylori* infection

Eradication treatment for the *Helicobacter pylori* infection is incorrect. Eradication therapy for helicobacter alone is insufficient. This man is iron deficient and therefore needs iron supplementation in addition.

C	Observation

Observation is incorrect. This man needs helicobacter eradication and iron supplementation.

D	Splenectomy

Splenectomy is incorrect. The most important aspect of this man's treatment is helicobacter eradication along with iron supplementation.

E	Transfusion of two units of packed RBCs

Transfusion of two units of packed RBCs is incorrect. His haemoglobin is satisfactory at 95 g/l and there is no suggestion of cardiovascular compromise.

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A 32-year-old woman who is 2 weeks post partum presents with a painful swollen left leg. She says it came on suddenly and woke her from sleep in the early hours of the morning. On examination her BP is 115/72 mmHg, pulse is 85/min and regular. Her left leg is swollen to the mid thigh, and is white and cold. There are no palpable pulses below the femoral pulse on the left-hand side and she has markedly decreased power below the knee, with decreased fine touch sensitivity. Investigations:

Hb	124 g/l
WCC	7.2 x 10^9/l
PLT	302 x 10^9/l
Na^+	137 mmol/l
K^+	4.5 mmol/l
HCO_3^-	16 mmol/l
Lactate	4.1 mmol/l
Creatinine	122 µmol/l

Which of the following is the most likely diagnosis?

A	Arterial embolism
B	Left leg DVT
C	Pathological fracture of the left femur
D	Post-partum lymphoedema
E	Ruptured popliteal cyst

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A	Arterial embolism

The leg is pale, pulseless, painful and paralysed, with significantly decreased muscle power below the knee. The raised lactatealso raises the possibility of tissue necrosis, and taking these factors into account, arterialembolism is the most likely diagnosis. Doppler ultrasound is the key investigation.

B	Left leg DVT

Left leg DVT is incorrect. Left leg DVT would not explain the clinical findings, especially the fact that there are no pulses below the femoral pulse on the left-hand side, and it would also not explain the reduced power below the knee.

C	Pathological fracture of the left femur

Pathological fracture of the left femur is incorrect. Pathological fracture of the left femur would not explain the absence of pulses below the femoral pulse; the lady's age is very young for a pathological fracture andthere is nothing in the question to suggest an underlying malignancy.

D	Post-partum lymphoedema

Post-partum lymphoedema is incorrect. Post-partum lymphoedema would not explain the absence of pulses, or the reduced power below the knee.

E	Ruptured popliteal cyst

Ruptured popliteal cyst is incorrect. Ruptured popliteal cyst would not explain the clinical findings of the white, cold leg, with absent pulses below the femoral pulse.

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A patient presents with jaundice. Physical examination reveals an enlarged, nodular liver. CT scan of the abdomen shows a cirrhotic liver with a large mass, and the CT-guided biopsy of the mass demonstrates a malignant tumour derived from hepatic parenchymal cells.

Infection with which one of the following viruses would most likely be directly related to the development of this tumour?

A	Epstein–Barr virus
B	Hepatitis B virus
C	Human herpes virus 8
D	Human papillomavirus
E	Human T-lymphocyte virus

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China, for example, liver cancer accounts for about 20% of all cancer deaths, the large majority of which are a result of chronic lifelong infection with the virus. Infant vaccination against the virus is now being introduced and will protect the new generation, but will not provide retrospective protection.

A	Epstein-Barr virus

Epstein-Barr virus is incorrect. Epstein-Barr virus is associated with the development of Burkitt's and Hodgkin's lymphomas and some central nervous system malignancies.

C	Human herpes virus 8

Human herpes virus 8 is incorrect. Human herpes virus 8 is associated with the development of Kaposi's sarcoma in immunosuppressed patients.

D	Human papillomavirus

Human papillomavirus is incorrect. Human papillomavirus (in particular type 16 and 18) is associated with the development of cervical, anal and oro-pharyngeal cancers.

E	Human T-lymphocyte virus

Human T-lymphocyte virus is incorrect. Human T-lymphocyte virus is associated with the development of leukaemia.

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A 49-year-old woman who is 12 months post-chemotherapy for carcinoma of the breast comes to the clinic for review. The regime included use of trastuzumab. She has significant shortness of breath, which has increased over the past 4 weeks. On examination her BP is 135/80 mmHg, pulse 92 bpm regular. Her JVP is raised 6 cm and she has bilateral ankle swelling. Respiratory examination revealed bibasal crackles.

Which one of the following is the most likely diagnosis?

A	Chemotherapy-related cardiac failure
B	Chemotherapy-related pulmonary fibrosis
C	Lymphangitis carcinomatosis
D	Malignant pleural effusion
E	Radiotherapy-related pulmonary fibrosis

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A	Chemotherapy-related cardiac failure

ERB-B2 (HER2) expression may be crucial in preventing the development of dilative cardiomyopathy; hence use of an inhibitor such as trastuzumab is likely to result in increased risk of cardiac failure. Although it would seem somewhat surprising that this woman presented 12 months after chemotherapy, one study showed that patients with early signs of cardiomyopathy developed worsening symptoms of heart failure over time.

B	Chemotherapy-related pulmonary fibrosis

Chemotherapy-related pulmonary fibrosis is incorrect. Chemotherapy-related pulmonary fibrosis is a side-effect of bleomycin chemotherapy which is not indicated in the management of breast cancer.

C	Lymphangitis carcinomatosis

Lymphangitis carcinomatosis is incorrect. If the JVP was not raised then lymphangitis or pulmonary infiltration would have been a consideration.

D	Malignant pleural effusion

Malignant pleural effusion is incorrect. Malignant pleural effusion is not in keeping with the examination findings described (bibasal crepitations).

E	Radiotherapy-related pulmonary fibrosis

Radiotherapy-related pulmonary fibrosis is incorrect. Radiotherapy-related pulmonary fibrosis could be considered, but there is no description of this patient receiving radiotherapy.

Le ve: Trastuzumab therapy predisposes to the de left ventricular impairment. Monitoring with

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A 53-year-old woman comes to see you regarding a possible diagnosis of essential thrombocytosis. She says her gynaecologist has noted a platelet count of 550 000/µl on three separate occasions over the past 2 years. Apart from two uneventful childbirths, the woman says she really has no significant medical history. She says she has never been told she was anaemic. Lab values reveal a normal haemoglobin, haematocrit and MCV. The platelet count is 580 000/µl. Your review of the peripheral blood smear reveals no microcytosis or hypochromia, but does show RBC Howell-Jolly bodies. The platelet count on the smear appears elevated, but there are no giant platelets or platelet clumps.

Which one of the following is the next most appropriate step in your diagnostic work-up?

A	Obtain a C-reactive protein and an erythrocyte sedimentation rate (ESR), looking for chronic inflammation
B	Obtain a ferritin level to confirm that there is no iron deficiency
C	Perform a bone marrow aspirate and biopsy
D	Perform chest, abdominal and pelvic computed tomography (CT) scans, searching for an occult malignancy
E	Test for the JAK2 mutation

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A	Obtain a C-reactive protein and an erythrocyte sedimentation rate (ESR), looking for chronic inflammation

This is an important first step in the management of thrombocytosis. If there is evidence of chronic inflammation, then this should be appropriately investigated.

E	Test for the JAK2 mutation

Test for the JAK2 mutation is incorrect. Looking for a JAK2 mutation is important if one confirms that the thrombocytosis is persistent, there is no iron deficiency and there are no reactive causes. This mutation is present in approximately 50% of patients with essential thrombocythaemia.

B	Obtain a ferritin level to confirm that there is no iron deficiency

Obtain a ferritin level to confirm that there is no iron deficiency is incorrect. Obtaining a ferritin level to confirm there is no iron deficiency is a very useful non-invasive step, and should probably be done after obtaining CRP and ESR to exclude a reactive thrombocytosis.

C	Perform a bone marrow aspirate and biopsy

Perform a bone marrow aspirate and biopsy is incorrect. Performing a bone marrow aspirate and biopsy is not the next most appropriate step as this is an invasive procedure, and one needs to exclude other reactive causes for thrombocytosis first. In addition, a calreticulin (CALR) mutation may also identify some patients who are JAK2 negative, who have underlying essential thrombocythaemia.

D	Pe…chest, abdominal and pelvic computed to…phy (CT) scans, searching for an occult …

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A 22-year-old female who has recently completed a third course of chemotherapy for osteosarcoma presents to the Emergency Department feeling very unwell. Over the past 1 to 2 weeks she has suffered increasing shortness of breath with a frequent, dry cough. On examination she is pyrexial 38.8 °C, and has disseminated coarse crackles on auscultation of the chest. Her BP is 105/70 mmHg and her pulse is 95 bpm. She is found to have disseminated mycobacterium avium infection (MAI) and is admitted to the oncology ward for further care.

What level of barrier nursing, isolation, or other measures are required?

A	Anti-TB medication for contacts
B	Gown, mask and gloves
C	Respiratory isolation
D	TB vaccination for contacts
E	Usual ward care

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C	Respiratory isolation

Given this patient is to be admitted to the oncology ward and is likely to be shedding mycobacterium in respiratory droplets, it seems prudent to introduce respiratory isolation, as other patients on the ward may be susceptible to infection due to chemotherapy-induced neutropaenia.

In this patient with disseminated MAI infection, clarithromycin or azithromycin in combination with ethambutol and rifabutin is the treatment of choice. Macrolide and quinolone combination may result in MAI resistance and should be avoided.

A	Anti-TB medication for contacts

Anti-TB medication for contacts is incorrect. In practice there is little risk of infection in immunocompetent individuals.

B	Gown, mask and gloves

Gown, mask and gloves is incorrect. Gown, mask and gloves are standard isolation precautions for neutropaenic patients, but will not provide protection against respiratory infections.

D	TB vaccination for contacts

TB vaccination for contacts is incorrect. In practice there is little risk of infection in immunocompetent individuals and TB vaccination is specific for *Mycobacterium tuberculosis*.

E	Usual ward care

Usual ward care is incorrect. Usual ward care is inappropriate owing to the risk of infection for other patients.

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A 19-year-old student presents to the Emergency Department with a 6-hour history of severe headache and decreased level of consciousness. He has a temperature of 39°C and a widespread petechial rash.His Glasgow Coma Scale is 5/15. Emergency resuscitation is instituted, including the immediate administration of penicillin.

His blood results are reported as follows:

Hb	10.5 g/dl (13-18)
WCC	16.3 × 10^9/l ((4-11) × 10^9)
platelets	18 × 10^9/l ((150-400) × 10^9)
PT	26 s (12-17)
APPT	53 s (24-38)
TT	29 s (14-22)
reptilase time	28 s (15-18)
fibrinogen	0.7 g/l (2-5)
FDP	112 µg/ml (< 10)

Which one of the following is the most likely cause of his coagulation problem?

A Acute myeloid leukaemia

B Blood loss

C Disseminated intravascular coagulation

D thrombocytopenic purpura

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Hb	10.5 g/dl (13–18)
WCC	16.3 × 10^9/l ((4–11) × 10^9)
platelets	18 × 10^9/l ((150–400) × 10^9)
PT	26 s (12–17)
APPT	53 s (24–38)
TT	29 s (14–22)
reptilase time	28 s (15–18)
fibrinogen	0.7 g/l (2–5)
FDP	112 µg/ml (< 10)

Which one of the following is the most likely cause of his coagulation problem?

A Acute myeloid leukaemia

B Blood loss

C Disseminated intravascular coagulation

D Immune thrombocytopenic purpura

E Over-transfusion with colloid

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fibrinogen	0.7 g/l (2–5)
FDP	112 µg/ml (< 10)

Which one of the following is the most likely cause of his coagulation problem?

Your answer was correct

A	Acute myeloid leukaemia
B	Blood loss
C	Disseminated intravascular coagulation
D	Immune thrombocytopenic purpura
E	Over-transfusion with colloid

Explanation

C	Disseminated intravascular coagulation

This man has prolonged clotting times with a low fibrinogen and elevated fibrin degradation products. The latter are also known as D-dimers. The clotting parameters therefore are entirely typical of DIC.

A	Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. His white cell count is only slightly elevated and there is nothing to suggest in the question that this is as underlying acute promyelocytic leukaemia. Acute promyelocytic leukaemia can cause DIC and is a form of acute

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Which one of the following is the most likely finding in the stable phase of chronic myeloid leukaemia?

A	Enlargement of the spleen
B	Enlargement of lymph nodes
C	Pulmonary infiltrates
D	Joint swelling
E	Enlargement of the liver

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A	Enlargement of the spleen
B	Enlargement of lymph nodes
C	Pulmonary infiltrates
D	Joint swelling
E	Enlargement of the liver

Explanation

A	Enlargement of the spleen

Chronic myeloid leukaemia, along with myelofibrosis, are the two major causes of significant splenomegaly. It should be noted that splenomegaly is not always found in all cases of chronic myeloid leukaemia.

B	Enlargement of lymph nodes

Enlargement of lymph nodes is incorrect, this is not the most likely finding in the stable phase of chronic myeloid leukaemia.

C	Pulmonary infiltrates

Pulmonary infiltrates is incorrect, this is not the most likely finding in the stable phase of chronic myeloid leukaemia.

D	Joint swelling

Joint s is incorrect, this is not the most likely finding in the stable phase of chronic myeloid leukaemia.

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A 72-year-old woman presents with worsening back pain. She also feels generally weak. An X-ray of her back shows multiple vertebral collapses and lytic lesions. General physical examination apart from pain over the lower back is unremarkable. Routine blood testing reveals that she is anaemic with a raised viscosity, and she has proteinuria on dipstick.

Which one of the following is the most likely diagnosis?

A	Bone metastases
B	Chronic myeloblastic leukaemia
C	Multiple myeloma
D	Osteoporosis
E	Osteosarcoma

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Dr Aya Mrcp
1 minute ago

D	Osteoporosis
E	Osteosarcoma

Explanation

C	Multiple myeloma

Multiple myeloma is the most likely diagnosis. She has back pain with lytic lesions which strongly suggests this diagnosis. She has non-specific symptoms such as anaemia and a raised viscosity and proteinuria may suggest the presence of Bence Jones protein.

A	Bone metastases

Bone metastases is incorrect. Bony metastases is the other differential. It would, however, be unlikely to cause lytic lesions, and the next evaluation would be to see whether or not this lady has evidence of a paraprotein or abnormal serum free light chains.

B	Chronic myeloblastic leukaemia

Chronic myeloblastic leukaemia is incorrect. Chronic myeloblastic leukaemia causes a raised white cell count. It certainly does not cause vertebral collapse and lytic lesions.

D	Osteoporosis

Osteoporosis is incorrect. This would not explain the lytic lesions, anaemia and raised viscosity.

E	Osteosarcoma

Osteos a is incorrect. Osteosarcoma is a very rare diagnosis and would be unlikely to cause lytic lesions with multiple levels of

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8:41

A 17-year-old boy who works in a farm shop presents for review. He has had gastroenteritis for a few days and is now feeling more unwell. Previously to that he received a course of penicillin 3 weeks ago for a sore throat. His mother has noticed that he has an increasing tendency to bruise, and he has been complaining of increasing headaches. During the morning of presentation he is said to have collapsed after breakfast and may have suffered an epileptic fit. Laboratory investigations reveal a haemolytic anaemia, thrombocytopenia and raised creatinine and bilirubin levels. Urine dipstick is positive for blood and protein.

What diagnosis fits best with this clinical picture?

A	Henoch-Schönlein purpura
B	Idiopathic thrombocytopaenic purpura
C	Penicillin allergy
D	Systemic lupus erythematosus
E	Thrombotic thrombocytopaenic purpura

#5470

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8:44

E Thrombotic thrombocytopaenic purpura

This 17-year-old boy has bruising, with evidence of neurological features with a fit. He has haemolytic anaemia with a thrombocytopaenia, with a raised bilirubin level. The raised bilirubin level will go with the haemolysis. Therefore this young man has haemolytic anaemia, thrombocytopaenia, with evidence of renal and neurological problems. This is therefore consistent with thrombotic thrombocytopaenic purpura.

A Henoch-Schönlein purpura

Henoch-Schönlein purpura is incorrect. Henoch-Schönlein purpura would not cause any of the blood abnormalities apart from a raised creatinine. It can be associated with a rash, but would not lead to neurological symptoms.

B Idiopathic thrombocytopaenic purpura

Idiopathic thrombocytopaenic purpura is incorrect. Idiopathic thrombocytopaenic purpura would lead to a simple isolated thrombocytopaenia. It would not lead to his neurological symptoms, haemolytic anaemia or raised creatinine.

C Penicillin allergy

Penicillin allergy is incorrect. Penicillin allergy would not lead to the clinical and laboratory features that are outlined in the question.

D Systemic lupus erythematosus

Systemic lupus erythematosus (SLE) is incorrect. The clinical and laboratory features are typical of thrombotic thrombocytopaenicpurpura, making SLE unlikely.

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A 22-year-old patient who is a vegan and very active has been complaining of tiredness and shortness of breath for the last 2 months. On examination she looks anaemic.

Which one of the following is the most likely vitamin deficiency causing her anaemia?

A	Vitamin A
B	Vitamin B1
C	Vitamin B6
D	Vitamin B12
E	Vitamin C

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Patients who are vegans can become vitamin B12 deficient because of nutritional deficiency. This really does only occur, however, in true vegans and takes many years to develop. This is because of the extensive B12 stores the body normally maintains.

A	Vitamin A

Vitamin A is incorrect. This has no role in red cell production.

B	Vitamin B1

Vitamin B1 is incorrect. This has no role in red cell production.

C	Vitamin B6

Vitamin B6 is incorrect. This has no role in red cell production.

E	Vitamin C

Vitamin C is incorrect. This has no role in red cell production.

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A previously well 17-year-old boy presents to the Emergency Department with a 3-day history of severe diarrhoea. On examination his temperature is 37.8°C and he has a petechial rash on his lower limbs. His laboratory investigations are as follows:

Hb	13.2 g/dl (13-18)
WCC	13.2 x 10^9/l (4-11 x 10^9) with a normal differential
Platelets	15 x 10^9/l (150-100)
Reticulocytes	184 x 10^9/l (50-100)
PT	13 s (12-17)
APPT	32 s (24-38)
TT	16 s (14-22)
Fibrinogen	2.4 g/l (2-5)
d-dimer	285 ng/ml (< 230)
Urea	35 mmol/l (2.5-7.5)
Na^+	138 mmol/l (137-144)
K^+	3.9 mmol/l (3.5-4.9)
Creatinine	562 µmol/l (60-110)
AST	21 U/l (1-31)
ALT	35 U/l (5-35)
ALP	64 U/l (45-105)
Bilirubin	38 µmol/l (1-22)
LDH	856 U/l (10-250)

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Which of the following is most likely diagnosis?

osama Sadig's screen

8:48

Bilirubin	38 µmol/l (1-22)
LDH	856 U/l (10-250)

Which one of the following is most likely diagnosis?

Your answer was correct

A	Acute glomerulonephritis
B	Haemolytic-uraemic syndrome
C	Immune thrombocytopenic purpura
D	Meningococcal meningitis
E	Systemic lupus erythematosus

Explanation

B	Haemolytic-uraemic syndrome

This boy is febrile with a significant isolated thrombocytopenia. This means that his platelet count is very low, with a normal haemoglobin and white cell count. The clotting tests are normal. There is a raised reticulocyte count. There is evidence of haemolysis, with a raised bilirubin and LDH levelin the presence of otherwise normal liver function. He also has very significant renal impairment on the background of severe diarrhoea. All of this is classically associated with the haemolytic uraemic syndrome (HUS), and many cases are related to infection with a strain of Escherichia coli 0157 that produces shiga toxin.

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A	Acute glomerulonephritis

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8:48

Dr Aya Mrcp
9 minutes ago

and many cases are related to infection with a strain of Escherichia coli 0157 that produces shiga toxin.

A	Acute glomerulonephritis

Acute glomerulonephritis can obviously cause acute renal impairment, but again would not be associated with such a low platelet count of 15 × 109/l.

C	Immune thrombocytopenic purpura

Immune thrombocytopenic purpura (ITP) is incorrect. Usually these patients are otherwise well, whereas this boy is clearly not well at all. ITP would not explain the diarrhoea, renal impairment or fevers that are classically associated with HUS.

D	Meningococcal meningitis

Meningococcal meningitis is incorrect. Meningococcal meningitis can cause thrombocytopenia through disseminated intravascular coagulation (DIC). This boy does not have DIC because the clotting tests are normal. There is no suggestion of meningitis in the history.

E	Systemic lupus erythematosus

Systemic lupus erythematosus (SLE) is incorrect. It would be very unusual for SLE to cause such a profound thrombocytopenia in the presence of a normal white cell count and platelet count. Again there is nothing in the history to suggest this condition.

45124

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8:48
Dr Aya Mrcp
10 minutes ago
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A 74-year-old man who last attended the doctor some 6 months earlier because of a rash on his shin presents to the clinic complaining of a lump at the base of his neck and cold blue finger tips. On further questioning he tells you that he has been suffering from fatigue and sweats at night for the past few months. You examine him and elicit left supraclavicular lymphadenopathy. He also has acrocyanosis. While you are arranging a follow-up he suffers a respiratory tract infection and is treated by the GP with clarithromycin.

Investigations:

Hb	109 g/l
WCC	18.1 x 10^9/l
PLT	410 x 10^9/l
Cold agglutinins	Positive
Na^+	141 mmol/l
K^+	5.5 mmol/l
Creatinine	135 µmol/l
ALT	180 U/l
LDH	642 U/l

Which one of the following is the most likely diagnosis?

A	Bronchial carcinoma
	nduced haemolysis

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8:49

Dr Aya Mrcp
10 minutes ago

from fatigue and dizziness. He has been unwell for the past few months. You examine him and elicit left supraclavicular lymphadenopathy. He also has acrocyanosis. While you are arranging a follow-up he suffers a respiratory tract infection and is treated by the GP with clarithromycin.

Investigations:

Hb	109 g/l
WCC	18.1 x 10^9/l
PLT	410 x 10^9/l
Cold agglutinins	Positive
Na^+	141 mmol/l
K^+	5.5 mmol/l
Creatinine	135 µmol/l
ALT	180 U/l
LDH	642 U/l

Which one of the following is the most likely diagnosis?

A	Bronchial carcinoma
B	Drug-induced haemolysis
C	Hodgkin's disease
D	Mycoplasma pneumonia
E	Non-Hodgkin's lymphoma

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E Non-Hodgkin's lymphoma

This man has evidence of lymphadenopathyin the supraclavicular region. He also has night sweats and acrocyanosis. His white cell count is slightly elevated, he is anaemic, and also has cold agglutinins present. Cold agglutinins are immunoglobulins that bind to red blood cells at cold temperatures, and can be associated with underlying lymphoproliferative disease. He therefore should have his lymph node biopsied to make the definitive diagnosis.

D Mycoplasma pneumonia

Mycoplasma pneumonia is incorrect. Mycoplasma pneumonia would not explain the significant fatigue, night sweats or left supraclavicular lymphadenopathy.

A Bronchial carcinoma

Bronchial carcinoma is incorrect. Bronchial carcinoma is not typically associated with cold agglutinin disease. There is nothing else in the question to suggest this, such as a prolonged smoking history.

B Drug-induced haemolysis

Drug-induced haemolysis is incorrect. Cold agglutinins are typically associated with an underlying lymphoproliferative disorder, and drug-induced haemolysis would not explain his lymphadenopathy.

C Hodgkin's disease

Hodgkin's disease is incorrect. Hodgkin's disease is relatively rare in this age group, and it is not associated with cold agglutinins or acrocyanosis.

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A 28-year-old woman with a history of von Willebrand's disease type 1 comes to the Haematology Clinic for review. She has suffered from menorrhagia and required a 2-unit blood transfusion after removal of a diseased molar tooth 1 year earlier. She now requires removal of one further tooth.

How would you advise managing her with respect to potential blood loss?

A	Give cryoprecipitate at the time of the procedure
B	Give desmopressin a short time before the procedure
C	Give FFP at the time of the procedure
D	Give VWF containing factor VIII concentrate at the time of the procedure
E	Make whole blood available if needed

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8:56

Your answer was correct

A	Give cryoprecipitate at the time of the procedure
B	Give desmopressin a short time before the procedure
C	Give FFP at the time of the procedure
D	Give VWF containing factor VIII concentrate at the time of the procedure
E	Make whole blood available if needed

Explanation

B	Give desmopressin a short time before the procedure

Giving desmopressin (also known as DDAVP) a short time before the procedure would be the best way to manage this lady with von Willebrand's disease who now requires removal of a further tooth. DDAVP can raise von Willebrand factor and factor VIII levels. It is necessary to bear in mind that this is a relatively minor procedure, and that DDAVP would probably be the best way forward. This should be combined with tranexamic acid, an inhibitor of fibrinolysis.

A	Give cryoprecipitate at the time of the procedure

Give cryoprecipitate at the time of the procedure is incorrect. Cryoprecipitate is now only used to replace fibrinogen, particularly when there is life-threatening bleeding or DIC.

C	FP at the time of the procedure

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8:56

fibrinolysis.

A	Give cryoprecipitate at the time of the procedure

Give cryoprecipitate at the time of the procedure is incorrect. Cryoprecipitate is now only used to replace fibrinogen, particularly when there is life-threatening bleeding or DIC.

C	Give FFP at the time of the procedure

Give FFP at the time of the procedure is incorrect. Giving FFP at the time of the procedure is not an appropriate modern way of treating von Willebrand's disease.

D	Give VWF containing factor VIII concentrate at the time of the procedure

Give VWF containing factor VIII concentrate at the time of the procedure is incorrect. This is another alternative to DDAVP, but we do need to bear in mind that the procedure that she is undergoing is relatively mild, so, hopefully, desmopressin with tranexamic acid should be sufficient.

E	Make whole blood available if needed

Make whole blood available if needed is incorrect. Making whole blood available if needed is not an appropriate modern method of treating congenital bleeding disorders.

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A 40-year-old female is diagnosed with metastatic cancer. Part of the treatment for her particular tumour involves hormonal therapy. She recalls her father also received hormonal treatment although he had a different kind of tumour.

Which one of the following tumour types is not hormone responsive?

A	Breast
B	Endometrial
C	Prostate
D	Renal cell
E	Thyroid

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D Renal cell

There are no known hormonal influences on renal cell carcinoma. Management is surgical/ablative in localised disease, and primarily depends on molecularly targeted agents in advanced disease (eg tyrosine kinase inhibitors, m-TOR inhibitors and immunotherapy).

B Endometrial

Endometrial is incorrect. Thirty per cent of patients with metastatic endometrial cancer respond to progestogens.

A Breast

Breast is incorrect. Sixty per cent of breast tumours will be oestrogen receptor positive and, of these, two-thirds will respond to anti-oestrogen therapy, e.g. with tamoxifen.

C Prostate

Prostate is incorrect. Metastatic/locally advanced carcinoma of the prostate will respond to testosterone ablation (with orchidectomy or antiandrogens) producing a clinical remission in the majority of cases.

E Thyroid

Thyroid is incorrect. Thyroxine can be used to suppress thyroid-stimulating hormone patients with thyroid cancer.

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A 35-year-old woman who has suffered recurrent fetal loss at 8, 16 and 18 weeks comes to the clinic for review. She has no past medical history of note and takes no regular medication. On examination her BP is 125/72 mmHg, pulse is 70/min and regular. You note livedo reticularis affecting both legs. Investigations:

Hb	129 g/l
WCC	8.9 x 10^9/l
PLT	203 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	103 micromol/l
PT	14.2 s
APTT	62.1 s

Which antibody is likely to be present in her serum?

A	Anti-centromere antibody
B	Anti-D antibody
C	Anti-nuclear antibody
D	Anti-phospholipid antibody
E	Anti-smooth muscle antibody

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9:01

APTT	62.1 s

Which antibody is likely to be present in her serum?

Your answer was correct

A	Anti-centromere antibody
B	Anti-D antibody
C	Anti-nuclear antibody
D	Anti-phospholipid antibody
E	Anti-smooth muscle antibody

Explanation

D	Anti-phospholipid antibody

Anti-phospholipid antibodies are likely to be found in the serum of this 35-year-old woman. She has typical features of the anti-phospholipid antibody syndrome, and actually has had recurrent miscarriages and livedo reticularis. She has a prolonged APTT. Despite the prolonged APTT, such patients are at risk of paradoxical venous thrombotic events.

A	Anti-centromere antibody

Anti-centromere antibody is incorrect. Anti-centromere antibodies are associated with systemic sclerosis.

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antibody
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9:01

paradoxical venous thrombotic events.

A	Anti-centromere antibody

Anti-centromere antibody is incorrect. Anti-centromere antibodies are associated with systemic sclerosis.

B	Anti-D antibody

Anti-D antibody is incorrect. Anti-D antibodies lead to haemolytic disease of the new-born.

C	Anti-nuclear antibody

Anti-nuclear antibody is incorrect. Anti-nuclear antibodies are associated with SLE.

E	Anti-smooth muscle antibody

Anti-smooth muscle antibody is incorrect. Anti-smooth muscle antibodies are associated with auto-immune hepatitis.

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9:02

A 65-year-old man presents with a 4-month history of weakness and fatigue associated with chronic nasal bleeding. On direct questioning he also complains of shortness of breath, dizziness and headaches. On examination he looks pale and has hepatomegaly. Retinal examination reveals papilloedema with distended retinal vasculature. Hb is 7.0 g/litre.

Given the suspected diagnosis, what is the next step in obtaining the diagnosis?

A	Liver biopsy
B	Serum protein electrophoresis
C	Abdominal ultrasound
D	Erythrocyte sedimentation rate
E	ECG

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B	Serum protein electrophoresis

This man has symptoms and signs suggestive of hyperviscosity. Nasal bleeding, papilloedema and distended retinal vasculature all suggest this. In addition, he is anaemic with hepatomegaly. This all suggests Waldenström's macroglobulinaemia,which is a low-grade lymphoma associated with the production of an IgM paraprotein. This can be demonstrated and quantified with serum protein electrophoresis.

A	Liver biopsy

Liver biopsy is incorrect. Liver biopsy is too invasive and should not be considered.

C	Abdominal ultrasound

Abdominal ultrasound is incorrect. It will not demonstrate the underlying disorder.

D	Erythrocyte sedimentation rate

Erythrocyte sedimentation rate is incorrect. Although this may be raised, it would be a very non-specific finding.

E	ECG

ECG is incorrect. Again, it would not focus on the underlying disorder.

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A 52-year-old man has a 6-month history of back pain. He now presents to the Emergency Department with a 3-day history of confusion. On examination he is disorientated and drowsy. There are no other specific signs.

On investigation:

Hb	7.8 g/dll (13-18)
MCV	103 fl (80-96)
WCC	3.0 x 10^9/l (4-11 x 10^9) with a normal differential
Platelets	90 x 10^9/l (150-400 x 10^9)
Urea	29 mmol/l (2.5-7.5)
Na^+	135 mmol/l (137-144)
K^+	6.2 mmol/l (3.5-4.9)
Creatinine	569 µmol/l (60-110)
AST	22 U/l (1-31)
ALT	28 U/l (5-35)
ALP	78 U/l (45-105)
Bilirubin	15 µmol/l (1-22)
Total Protein	90 g/l (61-76)
Alb	23 g/l (37-49)
Corrected Ca	3.2 mmol/l (2.2-2.6)

X-ray of his lumbar spine shows multiple areas of osteopenia.

Which one of the following is the most likely diagnosis?

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A Hyperparathyroidism

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Urea	29 mmol/l (2.5-7.5)
Na^+	135 mmol/l (137-144)
K^+	6.2 mmol/l (3.5-4.9)
Creatinine	569 µmol/l (60-110)
AST	22 U/l (1-31)
ALT	28 U/l (5-35)
ALP	78 U/l (45-105)
Bilirubin	15 µmol/l (1-22)
Total Protein	90 g/l (61-76)
Alb	23 g/l (37-49)
Corrected Ca	3.2 mmol/l (2.2-2.6)

X-ray of his lumbar spine shows multiple areas of osteopenia.

Which one of the following is the most likely diagnosis?

A	Hyperparathyroidism
B	Metastatic lung carcinoma
C	Multiple myeloma
D	Non-Hodgkin's lymphoma
E	Thrombotic thrombocytopenic purpura

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C Multiple myeloma

This man is anaemic with evidence of renal impairment andhypercalcaemia. The differential diagnosis is between metastatic carcinoma and multiple myeloma. However, we are told that the total protein is raised at 90 g/l, with a low albumin level. The difference between the total protein and the albumin level is called the globulin fraction, which is clearly significantly raised, suggesting an underlying paraprotein.

E Thrombotic thrombocytopenic purpura

Thrombotic thrombocytopenic purpura is incorrect. Thrombotic thrombocytopenic purpura causes a microangiopathic haemolytic anaemia. This can be a cause of acute renal impairment and anaemia, but this is not typically associated with back pain. It can cause confusion. It is not, however, associated with hypercalcaemia or a raised globulin fraction.

A Hyperparathyroidism

Hyperparathyroidism is incorrect. This would not explain the increased gap between the total protein and the albumin. It is not usually associated with such significant renal impairment, or anaemia.

B Metastatic lung carcinoma

Metastatic lung carcinoma is incorrect. We are not told that there are any signs or symptoms to suggest a lung primary. Again, this diagnosis does not explain the gap between the total protein and the albumin level.

D Non-Hodgkin's lymphoma

Non-H s lymphoma is incorrect. This can cause ia and renal impairment. Renal impairment can result

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or a raised globulin fraction.

A Hyperparathyroidism

Hyperparathyroidism is incorrect. This would not explain the increased gap between the total protein and the albumin. It is not usually associated with such significant renal impairment, or anaemia.

B Metastatic lung carcinoma

Metastatic lung carcinoma is incorrect. We are not told that there are any signs or symptoms to suggest a lung primary. Again, this diagnosis does not explain the gap between the total protein and the albumin level.

D Non-Hodgkin's lymphoma

Non-Hodgkin's lymphoma is incorrect. This can cause hypercalcaemia and renal impairment. Renal impairment can result because of urinary tract obstruction or because of hypercalcaemia. However, we are told that there are no other specific signs such as lymphadenopathy and, again, this diagnosis does not explain the raised globulin fraction.

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A 38-year-old patient is being investigated for his anaemia. He has had a normal upper and lower GI endoscopy and renal function testing is unremarkable. A bone marrow biopsy shows a reduction of haematopoietic cells and a trephine biopsy shows mainly fatty bone marrow.

Which one of the following is the most likely diagnosis?

A	Aplastic anaemia
B	Chronic myeloid leukaemia
C	Erythropoietin deficiency
D	Folate deficiency
E	Vitamin B12 deficiency

43702

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user left the meeting

A Aplastic anaemia

This man has a bone marrow biopsy which shows a reduction in haematopoietic cells. Assessment of bone marrow cellularity is best made on trephine biopsy, which often shows replacement of the normal cellular marrow by fatty marrow.

B Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. In this condition there is a very active and expanded bone marrow, with greatly increased white cell production, as this is a myeloproliferative condition.

C Erythropoietin deficiency

Erythropoietin deficiency is incorrect. Erythropoietin deficiency is false because this would show selective reduction in erythropoiesis, but normal white cell and platelet production. In this question, we are told that the marrow biopsy shows a reduction in all haemopoetic cells.

D Folate deficiency

Folate deficiency is incorrect. Folate deficiency is incorrect because a bone marrow aspirate would show megaloblastic change, as would a trephine biopsy.

E Vitamin B12 deficiency

Vitamin B12 deficiency is incorrect because a bone marrow aspirate would show megaloblastic change, as would a trephine biopsy.

43702

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Which one of the following is the most frequent complication causing death in patients with chronic lymphocytic leukaemia (CLL)?

A	Transformation into highly malignant lymphoma
B	Acute myeloblastic leukaemia due to secondary neoplasia
C	Acute haemorrhage
D	Infections
E	Iron overload owing to frequent transfusions

41777

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D	Infections

Infections are the most frequent complication causing death in patients with CLL. The major predisposing factor for this is a reduction in immunoglobulin production causing hypogammaglobulinaemia. Chest infections are common.

A	Transformation into highly malignant lymphoma

Transformation into a highly malignant lymphoma is incorrect. Transformation into a highly malignant lymphoma ,ie high-grade transformation, can occur and is called Richter's transformation. However, this is uncommon. Infections are much more of a problem.

B	Acute myeloblastic leukaemia due to secondary neoplasia

Acute myeloblastic leukaemia due to a secondary neoplasia is incorrect. Acute myeloblastic leukaemia due to a secondary neoplasia again can occur, but this is rare.

C	Acute haemorrhage

Acute haemorrhage is incorrect and is not a common complication of patients with CLL.

E	Iron overload owing to frequent transfusions

Iron overload owing to frequent transfusions is incorrect. Iron overload owing to frequent transfusions can occur, but it is not the most frequent complication that will result in the demise of patients with CLL.

1773

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7:37
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Question 1 of 100

A 62-year-old woman with breast cancer underwent a left modified radical mastectomy for an intraductal carcinoma 2 years ago. She now presents to the Emergency Department with confusion, lethargy and thigh pain. X-ray reveals a cystic lesion in the shaft of a femur.

Which one of the following is the most likely blood abnormality?

A	Calcium decreased
B	Calcium increased
C	Glucose increased
D	Potassium decreased
E	Potassium increased

45535

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B	Calcium increased

Malignancy is the most common cause of hypercalcaemia in hospital patients, and breast and lung cancers are the most frequently associated with this condition. Hypercalcaemia of malignancy is caused by either osteolytic bony metastases with local release of cytokines, or by tumour secretion of parathyroid hormone-related protein (PTHrP) and/or 1,25-dihydroxyvitamin D (calcitriol). Clinical manifestations of hypercalcemia involve the gastrointestinal tract(nausea, vomiting, constipation), central nervous system (weakness, lethargy, confusion, coma) and kidneys (polyuria, thirst).

A	Calcium decreased

Calcium decreased is incorrect. Bone metastasis would be very unlikely to cause hypocalcaemia.

C	Glucose increased

Glucose increased is incorrect. Symptoms of lethargy and confusion may be associated with severe hyperglycaemia (eg in hyperosmolar non-ketotic state), but this is not suggested by the scenario and there is no mention of the patient being diabetic.

D	Potassium decreased

Potassium decreased is incorrect. As described above, alterations in potassium status are important in cancer patients who are undergoing chemotherapy and are at risk of tumour lysis syndrome and renal failure, but are not directly related to the diagnosis of skeletal metastasis.

E	Potassium increased

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Potassium increased is incorrect. Alterations in potassium status are important in cancer patients who are undergoing

osama Sadig's screen

Which one of the following features is most characteristic of Waldenström's macroglobulinaemia?

A	Bone pain
B	Monoclonal IgM peak
C	Renal impairment
D	Multiple osteolytic lesions
E	Absence of immune paresis

41777

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Explanation

B	Monoclonal IgM peak

Waldenström's macroglobulinaemia is a low-grade lymphoma associated with lymphoplasmacytic cells that secrete an IgM paraprotein. Clinical features include lymphadenopathy, hepatosplenomegaly and hyperviscosity.

A	Bone pain

Bone pain is incorrect. Bone pain is not usually a feature of this condition.

C	Renal impairment

Renal impairment is incorrect. Renal impairment occurs relatively rarely in Waldenstroms macroglobulinaemia.

D	Multiple osteolytic lesions

Multiple osteolytic lesions is incorrect. Multiple osteolytic lesions are rare in this condition.

E	Absence of immune paresis

Absence of immune paresis is incorrect. Reduction in the other immunoglobulins such as IgG can occur, but the monoclonal IgM paraprotein is typical of Waldenström's macroglobulinaemia.

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A 46-year-old lady presents with a spontaneous iliofemoral thrombosis. She is found to be positive for the lupus anticoagulant and anticardiolipin antibodies are elevated > 50 u/l.

What intensity and duration of anticoagulation would you advise?

A	INR 2-3 for 6 months
B	INR 2-3 lifelong
C	INR 3-4.5 for 3 months
D	INR 3-4.5 lifelong
E	INR 3-4.5 for 1 year, followed by thrombo-prophylaxis in high-risk situations

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7:40

Explanation

B	INR 2-3 lifelong

INR 2-3 lifelong is the correct choice. An old study from 1995 had suggested that a targetINR of 3.5 was preferable to a target INR of 2.5. Two randomised trials subsequently have challenged this, and now the recommendation from the British Committee for Standards in Haematology is that the target INR should be 2.5 for treating patients with anti-phospholipid antibody syndrome. One does need to note that, to diagnose the anti-phospholipid antibody syndrome, the lupus anti-coagulant and/or anti-cardiolipin antibodies should be re-checked after at least 3 months to show that they are persistent.

A	INR 2-3 for 6 months

INR 2-3 for 6 months is incorrect. Assuming that there is the anti-phospholipidantibody syndrome present, the recurrence rate off anticoagulation can be high and therefore ongoing anti-coagulation is usually recommended. This of course does need to be balanced in every situation against the individual's bleeding risk.

C	INR 3-4.5 for 3 months

INR 3-4.5 for 3 months is incorrect. INR 3-4.5 for 3 months is false for two reasons. This duration of anti-coagulation is too short, and the target INR is too high.

D	INR 3-4.5 lifelong

INR 3-4.5 lifelong is incorrect. INR 3-4.5 lifelong as a target INR was initially thought to be required, but subsequently disproved. The recommendation from the British Committee for Standards in Haematology is that the target INR should be 2.5 for treating patients with anti-phospholipid antibody syndrome.

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A 17-year-old boy is visiting relatives in West Africa after schooling in England for his GCSEs. As part of his preparation to travel he has to be vaccinated against cholera and hepatitis A, and he has to take antimalarials such as primaquine. Two days after starting, he notices that his urine is dark and he experiences back pain. He is also jaundiced.

Which one of these enzyme abnormalities is most likely to be responsible for his clinical symptoms?

A	Glucose-6-phosphate dehydrogenase deficiency
B	Hexokinase deficiency
C	Phosphoenolpyruvate deficiency
D	Pyruvate kinase deficiency
E	Triose phosphate isomerase deficiency

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Previous Question | Skip Question

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7:42
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A	Glucose-6-phosphate dehydrogenase deficiency

We are told that the 17-year-old boy is of West African origin and he notices dark urine and back pain 2 days after starting primaquine. He is also jaundiced. The combination of dark urine and jaundice may lead to the suspicion of intravascular haemolysis. G6BD deficiency is common in African Americans and Africans.

B	Hexokinase deficiency

Hexokinase deficiency is incorrect. Hexokinase deficiency is also rare. All of the enzymes listed above can cause haemolysis, but are much rarer than G6PD deficiency.

C	Phosphoenolpyruvate deficiency

Phosphoenolpyruvate deficiency is incorrect. Phosphoenolpyruvate deficiency is rare and so less likely than G6PD deficiency.

D	Pyruvate kinase deficiency

Pyruvate kinase deficiency is incorrect. Pyruvate kinase deficiency is not particularly associated with people from West Africa.

E	Triose phosphate isomerase deficiency

Triose phosphate isomerase deficiency is incorrect. Triose phosphate isomerase deficiency is rare. It is always a brave response to mark an answer is true when you have not heard of the answer because of its rarity.

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Question 5 of 100

A 24-year-old woman has been diagnosed with Hodgkin's lymphoma stage IA.

Which therapy is indicated?

A	Radiotherapy alone
B	Combination chemotherapy followed by radiotherapy
C	High-dose chemotherapy with concurrent radiotherapy
D	High-dose chemotherapy with bone marrow transplantation
E	Lymphadenectomy and chemotherapy

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Explanation

B Combination chemotherapy followed by radiotherapy

Two to four cycles of combined chemotherapy in the form of ABVD are usual, followed by radiotherapy.

E Lymphadenectomy and chemotherapy

Lymphadenectomy and chemotherapy is incorrect. There is no role for surgery in the management of Hodgkin's lymphoma, apart from an initial lymph node biopsy.

A Radiotherapy alone

Radiotherapy alone is incorrect. Results are better with combined chemotherapy followed by radiotherapy in early stage Hodgkin's disease.

C High-dose chemotherapy with concurrent radiotherapy

High-dose chemotherapy with concurrent radiotherapy is incorrect. High-dose chemotherapy with stem cell transplantation is reserved for patients with Hodgkin's disease who have relapsed following initial treatment.

D High-dose chemotherapy with bone marrow transplantation

High-dose chemotherapy with bone marrow transplantation again is false for the above reason.

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Question 6 of 100

A 75-year-old woman attends her follow-up at the Haematology Clinic. She was initially referred by her GP with anaemia but currently has no symptoms. She had pulmonary TB 15 years ago, which was treated with a 6-month conventional course of chemotherapy. This patient has a long history of alcohol dependence but has not drunk for 8 years. Her family has tried to get her to move out of the old family house due to its poor state of repair. Routine blood tests show Hb 9.3 g/dl, MCV 83 fl, RDW (red cell distribution width) 23%, bilirubin 49 µmol/litre, LDH 537 U/litre with normal renal and liver function. The only significant finding on her bone marrow trephine is an accumulation of iron around the nuclei of developing erythrocytes.

What is the likely diagnosis?

A	Isoniazid effect
B	Megaloblastic anaemia
C	Myelodysplastic syndrome
D	Lead poisoning
E	Congenital sideroblastic anaemia

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Previous Question Skip Question

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Explanation

D	Lead poisoning

This can cause a normocytic anaemia with sideroblastic change. This is particularly associated with old houses that still have lead water pipes.

A	Isoniazid effect

The isoniazid effect is incorrect. This lady has not had isoniazid for many years, so this would not explain her current blood count abnormalities.

B	Megaloblastic anaemia

Megaloblastic anaemia is incorrect. This is false because the patient is not macrocytic. One would also be able to see megaloblastic change in the bone marrow, and this is not commented on in the question.

C	Myelodysplastic syndrome

Myelodysplastic syndrome is incorrect. Myelodysplastic syndrome is certainly a possibility, given the fact that this lady has a normocytic anaemia with ringed sideroblasts in the bone marrow. The fact, however, that the question has talked about the old family home in a poor state of repair should also suggest the alternative diagnosis of lead poisoning.

E	Congenital sideroblastic anaemia

Congenital sideroblastic anaemia is incorrect. This is clearly false as the pati 5 years of age and any congenital problems would have come to light many years earlier.

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A 72-year-old woman presents with worsening back pain. She also feels generally weak. An X-ray of her back shows multiple vertebral collapses and lytic lesions.

Given the likely clinical diagnosis, what is the most appropriate therapy for her underlying condition?

A	Bisphosphonates
B	Chemotherapy
C	Corticosteroids
D	Radiotherapy
E	Splenectomy

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Previous Question | Skip Question

Calculator

Normal Values

Annotation
Stop Share
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Audio
Video
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Participants
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The most likely clinical diagnosis here is multiple myeloma due to the lytic lesions. Combination chemotherapy is the most appropriate initial therapy for her underlying condition. This is usually a thalidomide containing regime with steroids, such as the CTD regimen (cyclophosphamide, thalidomide and dexamethasone), or MPT regime (melphalan, prednisone and thalidomide). Please note detailed knowledge of chemotherapy regimens is not required at MRCP level; broad principles are much more important.

A	Bisphosphonates

Bisphosphonates is incorrect. Bisphosphonates are not the most appropriate therapy for the underlying condition, but are crucial in supportive treatment of myeloma, to strengthen bone by encouraging bone formation. There is also some evidence to suggest that they have an anti-myeloma effect in their own right.

C	Corticosteroids

Corticosteroids is incorrect. Corticosteroids are an important part of treatment for multiple myeloma and, as you can see, they are combined with thalidomide and oral chemotherapy (either cyclophosphamide or melphalan) in the initial treatment. This therefore could well be regarded as a true answer.

D	Radiotherapy

Radiotherapy is incorrect. Radiotherapy is not the most appropriate initial therapy unless there is evidence of cord compression.

E	Splenectomy

Splenectomy is incorrect. Splenectomy is not part of myeloma therapy shape or form.

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supportive treatment of myeloma, to strengthen bone by encouraging bone formation. There is also some evidence to suggest that they have an anti-myeloma effect in their own right.

C Corticosteroids

Corticosteroids is incorrect. Corticosteroids are an important part of treatment for multiple myeloma and, as you can see, they are combined with thalidomide and oral chemotherapy (either cyclophosphamide or melphalan) in the initial treatment. This therefore could well be regarded as a true answer.

D Radiotherapy

Radiotherapy is incorrect. Radiotherapy is not the most appropriate initial therapy unless there is evidence of cord compression.

E Splenectomy

Splenectomy is incorrect. Splenectomy is not part of myeloma therapy in any shape or form.

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A 40-year-old patient has been complaining of headache, weakness, dizziness and pruritus for the last 2 months. He has also noticed a 2-stone (12.7 kg) weight loss. Gout was diagnosed some 6 months earlier. On examination he is cyanosed, has hepatosplenomegaly and his blood pressure is 170/100 mmHg.

Which one of the following is the most likely diagnosis?

A	Acute myeloblastic leukaemia
B	Chronic lymphocytic leukaemia
C	Chronic myeloid leukaemia
D	Myeloma
E	Polycythaemia vera

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Previous Question Skip Question

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E	Polycythaemia vera

This man has symptoms suggestive of a myeloproliferative condition in the fact that he has gout. This is due to increased cell turnover. In addition, he has symptoms of polycythaemia, namely headache, weakness and pruritus. This therefore is the most likely diagnosis. The important diagnostic test to demonstrate a mutation is the JAK2 gene, which is found in over 95% of patients with primary polycythaemia, which is also known as polycythaemia vera.

A	Acute myeloblastic leukaemia

Acute myeloblastic leukaemia is incorrect. Acute myeloid leukaemia is false because the symptoms have been coming on for too long. This normally causes symptoms of anaemia, infections or bleeding, which are not present here.

B	Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. There is no suggestion of any lymphadenopathy, and most patients now at presentation are diagnosed on an incidental blood count and are usually clinically well.

C	Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. Chronic myeloid leukaemia is a myeloproliferative condition, so that this could cause gout associated with hepatosplenomegaly. However, it would not explain the fact that he is cyanosed and somewhat hypertensive. It could cause symptoms of headache, weakness and dizziness due to the raised white cell count but it usually does not cause pruritus.

D	Myeloma

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Myelom orrect. This is not the clinical picture for myeloma, which is characterised by symptoms of hypercalcaemia, anaemia,

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A 20-year-old patient with coeliac disease presents with a bleeding abnormality. She has noticed an increased susceptibility to bleeding which is difficult to stop.

Which one of the following is the most likely cause?

A	Disseminated intravascular coagulation
B	Folate deficiency
C	Iron deficiency
D	Vitamin A deficiency
E	Vitamin K deficiency

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Previous Question | Skip Question

Calculator

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Explanation

E	Vitamin K deficiency

Vitamin K is a fat-soluble vitamin, and malabsorption of fat-soluble vitamins by bowel disorders such as coeliac or inflammatory bowel disease can cause vitamin K deficiency. Vitamin K is required for the production of the vitamin K coagulation factors, II, VII, IX and X.

A	Disseminated intravascular coagulation

Disseminated intravascular coagulation (DIC) is incorrect. There is no suggestion of another predisposing factor to DIC and this would not link in with the underlying coeliac disease.

B	Folate deficiency

Folate deficiency is incorrect. Folate deficiency will not, of course, have any impact on the blood coagulation.

C	Iron deficiency

Iron deficiency anaemia is incorrect. Iron deficiency again will not have any impact on the blood coagulation.

D	Vitamin A deficiency

Vitamin A deficiency is incorrect. Vitamin A deficiency will not have any effect on blood coagulation either.

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A 58-year-old Greek man is found to have a microcytic anaemia on routine screening at his daughter's general practitioner. Red cells have low mean corpuscular volume (MCV) and mean corpuscular haemoglobin (MCH). Serum ferritin is normal.

Which one of the following would be the next management step?

A	Barium enema
B	Haemoglobin electrophoresis
C	Iron therapy
D	Labelled red-cell scan
E	Upper and/or lower endoscopy

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Previous Question Skip Question

Calculator

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B Haemoglobin electrophoresis

The answer is Haemoglobin electrophoresis –

Haemoglobin electrophoresis would be the next appropriate management step. This Mediterranean man from Greece has a microcytic anaemia. Initial tests show that he is notiron deficient, as the serum ferritin is normal. Therefore, some form of thalassaemia should be suspected and thus haemoglobin electrophoresis would be the next managementstep. In beta thalassaemia trait, there is a raised haemoglobin A2 level.

E Upper and/or lower endoscopy

Upper and/or lower endoscopy (Option E) is incorrect. Upper and/or lower GI endoscopy is false, because this man is not iron deficient, and therefore does not require gastrointestinal investigations for this.

A Barium enema

Barium enema (Option A) is incorrect. This man is not iron deficient, therefore he should not have investigations for this.

C Iron therapy

Iron therapy (Option C) is incorrect. This man is not iron deficient, because the serum ferritin is normal, and therefore he does not require iron supplementation.

D Labelled red-cell scan

Labelled red-cell scan (Option D) is incorrect. This test is most often done to find a site of bleeding in patients who have gastrointestinal blood loss.

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7:52
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A 25-year-old woman is admitted with hypertension, proteinuria and epigastric pain. She is 33 weeks' pregnant with her first child, which is a breech presentation. On examination her BP is 145/90 mmHg, pulse is 85 bpm and regular. She has areas of bruising and petechial haemorrhage on examination of her skin. A caesarean delivery is planned. Investigations:

Hb	101 g/l
WCC	9.9 x 10^9/l
PLT	40 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	130 µmol/l
ALT	180 U/l
LDH	780 U/l

Which one of the following is the management of choice?

A	Arrange an FFP transfusion
B	Arrange an ultrasound scan of the liver
C	Arrange a platelet transfusion
D	Arrange a red cell transfusion
E	Arrange an immediate caesarean

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C Arrange a platelet transfusion

This pregnant lady needs urgent caesarean section. She has evidence of thrombocytopaenia, associated with deranged liver function. There is evidence of pre-eclampsia, with hypertension and proteinuria. It sounds as if an urgent caesarean section is planned, which will give little time for maternal steroids to be administered and take effect. Therefore, urgent platelet transfusion will be required to support this operative procedure.

E Arrange an immediate caesarean

Arrange an immediate caesarean is incorrect. Arranging immediate caesarean section would be risky with a platelet count of 40, so it would certainly be prudent to arrange a platelet transfusion beforehand. This presentation would be compatible with the HELLP syndrome, named for three features of the disease, namely haemolysis, elevated liver enzymes and low platelet levels. Some propose that this syndrome is a severe form of pre-eclampsia, and this lady certainly has evidence of pre-eclampsia, with hypertension accompanied by proteinuria.

A Arrange an FFP transfusion

Arrange an FFP transfusion is incorrect. Arranging an FFP transfusion would only be required if there was a coagulopathy, and there is no information that this is the case in the question.

B Arrange an ultrasound scan of the liver

Arrange an ultrasound scan of the liver is incorrect. Arranging an ultrasound scan of the liver is delaying the caesarean delivery and administration of appropriate platelets beforehand.

D a red cell transfusion

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A 37-year-old man noticed some mild nose bleeds followed by a small patchy reddening on both legs associated with bruising. His treatment for chronic polyarthritis was switched 2 weeks ago. Haematology laboratory results reveal a thrombocyte count of 9 × 10^9/litre, otherwise his blood counts were normal.

Which one of the following is the next step in identifying the cause?

A	Cytological bone marrow examination
B	Histological bone marrow examination
C	Identification of the new medication
D	Therapeutic trial with prednisolone
E	Abdominal ultrasound with spleen measurement

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Previous Question Skip Question

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C	Identification of the new medication

This young man now has an isolated thrombocytopenia. The pertinent information is that he has started new medication 2 weeks previously. It is clearly important therefore to identify what this medication was and to stop it. The platelet count should respond quite quickly and, although a trial of prednisolone might be required, identification of the new medication and its cessation is the most important answer.

A	Cytological bone marrow examination

Cytological bone marrow examination is incorrect. Cytological bone marrow examination is not usually required initially given the above clinical situation, but if the bone platelet count failed to respond to the cessation of the medication,or there were any other abnormalities in the blood count, this may well be required.

B	Histological bone marrow examination

Histological bone marrow examination is incorrect, this would not be the next step in identifying the cause.

D	Therapeutic trial with prednisolone

Therapeutic trial with prednisolone is incorrect, but could be required as a secondary measure after the identification and cessation of the new medication.

E	Abdominal ultrasound with spleen measurement

Abdominal ultrasound with spleen measurement is incorrect. This would not be the next step in identifying the cause.

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A 32-year-old man is seen in the Emergency Department complaining of breathlessness, which has gradually worsened over the last weeks following an emergency appendectomy. He received no blood products at the time of operation. He has not noticed any frank blood loss. Currently, he is taking prn diclofenac for post-operative pain relief. This man has a past history of recurrent deep vein thromboses, the last of which was complicated by a pulmonary embolism 2 years ago. He declined long-term anticoagulation. A full blood count shows:

Hb 8.8 g/dl; MCV 89 fl; platelets 105 × $10^3/mm^3$; WCC 6.3 × $10^3/mm^3$. Urinalysis shows the presence of haemosiderin.

Which investigation is most reliably diagnostic?

A	Bone marrow trephine
B	Blood immunophenotyping
C	Coombs' test
D	Acid lysis test
E	Serum haptoglobin

41715

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Previous Question Skip Question

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Explanation

B	Blood immunophenotyping

Before discussing which investigation is most reliably diagnostic, you need to know what the underlying diagnosis is here. Essentially, this young man has a history of venous thrombotic events. He is anaemic and thrombocytopenic. As there are therefore problems with both red cell and platelet numbers, an underlying marrow disorder should be considered. Haemosiderin is essentially storage iron.It is necessary to know how this is formed. Essentially this occurs in chronic intravascular haemolysis in which haemoglobin is released from the red blood cells into the blood stream. This haemoglobin is then absorbed by the cells in the proximal tubule of the kidney, and then these cells slough off, with haemosiderin inside. They are then excreted into the urine. The cells can then be stained to demonstrate the presence of haemosiderin.

This young man has had venous thrombotic events, the possibility of a bone marrow disorder and chronic intravascular haemolysis.This all suggests a diagnosis of paroxysmal nocturnal haemoglobinuria (PNH).

Blood immunophenotyping is the correct answer. This is the modern way of diagnosing PNH. In PNH, there is loss of the GPI anchor, which holds CD59 and CD55 to the surface of blood cells, especially red blood cells. When the anchor is lost, the red cells lose their expression of CD55 and CD59. This can be measured through the process of immunophenotyping, also known as flow cytometry.

C	Coombs' test

Coombs' test is incorrect. Coomb's test will be negative in this situation, as it is not an auto-immune haemolytic problem. This will not help in any way to diagnose PNH.

A	Bone marrow trephine

Bone marrow trephine is incorrect because this will not actually

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This young man has had venous thrombotic events, the possibility of a bone marrow disorder and chronic intravascular haemolysis.This all suggests a diagnosis of paroxysmal nocturnal haemoglobinuria (PNH).

Blood immunophenotyping is the correct answer. This is the modern way of diagnosing PNH. In PNH, there is loss of the GPI anchor, which holds CD59 and CD55 to the surface of blood cells, especially red blood cells. When the anchor is lost, the red cells lose their expression of CD55 and CD59. This can be measured through the process of immunophenotyping, also known as flow cytometry.

C	Coombs' test

Coombs' test is incorrect. Coomb's test will be negative in this situation, as it is not an auto-immune haemolytic problem. This will not help in any way to diagnose PNH.

A	Bone marrow trephine

Bone marrow trephine is incorrect because this will not actually make the diagnosis that you are trying to achieve of PNH.

D	Acid lysis test

Acid lysis test is incorrect. This used to be the old-fashioned way of diagnosing PNH, but flow cytometry looking for expression of CD55 and CD59 is much more reliable.

E	Serum haptoglobin

Serum haptoglobin is incorrect. Serum haptoglobin will be reduced in chronic intravascular haemolytic states. However, this will not diagnose PNH specifically.

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A 75-year-old retired car mechanic who is a smoker is diagnosed with lung cancer. Some 10 years ago he was treated with surgery and adjuvant chemotherapy for bladder cancer. His brother had oesophageal cancer aged 66 and another brother had prostate cancer in his 70s. His 55-year-old daughter was recently diagnosed with breast cancer.

Which one of the following is the most likely explanation for the cancers in your patient?

A	A hereditary cancer predisposition syndrome
B	Exposure to aniline dyes
C	Exposure to asbestos
D	Exposure to tobacco smoke
E	The second tumour is a late complication of chemotherapy

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Previous Question | Skip Question

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D	Exposure to tobacco smoke

The answer is Exposure to tobacco smoke –

It is not uncommon for an individual to have two different malignancies over a lifetime and sometimes this can be owing to a genetic predisposition, eg colorectal and endometrial cancer in a woman with hereditary non-polyposis colorectal cancer. There is a family history of cancer here, but they are all common cancers with no specific pattern or diagnosis at an early age. Features in a family history that would suggest a genetic predisposition include a young age at onset (typically below 50), specific combinations (eg breast and ovarian cancer), unusual cancers and multiple affected relatives.

The carcinogen most likely to be implicated in both cancers in this case is tobacco smoke.

A	A hereditary cancer predisposition syndrome

A hereditary cancer predisposition syndrome (Option A) is incorrect. There are no features suggesting a genetic predisposition here.

B	Exposure to aniline dyes

Exposure to aniline dyes (Option B) is incorrect. Aniline dye exposure is a risk factor for bladder cancer but there is no known association with lung cancer.

C	Exposure to asbestos

Exposure to asbestos (Option C) is incorrect. Asbestos exposure is a risk factor for mesothelioma but only rarely is associated with bladder cancer.

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E The second tumour is a late complication of chemotherapy
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A hereditary cancer predisposition syndrome (Option A) is incorrect. There are no features suggesting a genetic predisposition here.

B	Exposure to aniline dyes

Exposure to aniline dyes (Option B) is incorrect. Aniline dye exposure is a risk factor for bladder cancer but there is no known association with lung cancer.

C	Exposure to asbestos

Exposure to asbestos (Option C) is incorrect. Asbestos exposure is a risk factor for mesothelioma but only rarely is associated with bladder cancer.

E	The second tumour is a late complication of chemotherapy

The second tumour is a late complication of chemotherapy (Option E) is incorrect. Lung cancer is not a common late complication of chemotherapy, and would be unlikely to develop within 10 years of treatment for bladder cancer.

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A 21-year-old man presents to the Emergency Department with an acutely swollen, tender left knee. He has taken 180 mg of codeine over the past few hours. He has a history of sickle cell disease and has suffered a number of painful crises over the past few years. On examination his BP is 145/72 mmHg, pulse is 98/min and regular, and he is in severe pain. The left knee is swollen and tender but not warm. He is apyrexial. O_2 sats are measured at 91% on pulse oximeter. Investigations:

Hb	70 g/l (reticulocyte count 17%, many sickle cells seen)
WCC	9.8 x 10^9/l
PLT	178 x 10^9/
Na^+	138 mmol/l
K^+	4.7 mmol/l
Creatinine	130 micromol/l
pH	7.32
Bicarbonate	22 mmol/l

Which of the following is the most appropriate next step?

A	IV diamorphine
B	IV flucloxacillin
C	IV normal saline
D	lofenac

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E Oxygen therapy

Oxygen therapy is the next most appropriate step. This man has sickle cell disease with a previous history of painful crises. He is hypoxic. Joint pain is a presenting feature of vaso-exclusive crisis in sickle cell disease, related to tissue hypoxia. Relief of hypoxia is therefore a key step in therapy. This should then be followed closely by further pain relief with intravenous opiates as required.

C IV normal saline

IV normal saline is incorrect. Clearly adequate hydration will be important in this man'smanagement, but oxygen therapy is the most pressing next step.

A IV diamorphine

IV diamorphine is incorrect. Although intravenous diamorphine is clearly a very important step in this man's management, the most important step is oxygen therapy.

B IV flucloxacillin

IV flucloxacillin is incorrect. There is no indication of infection and therefore, at this stage, intravenous antibiotics are not a key priority.

D Oral diclofenac

Oral diclofenac is incorrect. Oral diclofenac is an effective analgesic in patients with sickle cell disease, but this should not override the need for oxygen therapy in this young man.

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You are examining data from studies of prevention of venous thromboembolism, comparing the efficacy of low molecular weight heparins with agents that have a different mode of action, so that you can recommend re-writes to your hospital guidelines.

Which of the following represents the mode of action of fondaparinux?

A	Direct platelet inhibitor
B	Factor IX inhibitor
C	Factor X inhibitor
D	Factor XII inhibitor
E	Thrombin inhibitor

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Previous Question | Skip Question

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Explanation

C Factor X inhibitor

Fondaparinux binds to anti-thrombin, increasing the inhibition on factor Xa. Neutralisation of factor Xa interrupts the coagulation cascade and inhibits thrombin formation and thrombus development.

A Direct platelet inhibitor

Direct platelet inhibitor is incorrect. Fondaparinux has no effect on platelets.

B Factor IX inhibitor

Factor IX inhibitor is incorrect. The correct mode of action of fondaparinux is through inhibition of factor X.

D Factor XII inhibitor

Factor XII inhibitor is incorrect. The correct mode of action of fondaparinux is through inhibition of factor X.

E Thrombin inhibitor

Thrombin inhibitor is incorrect. Fondaparinux does not inactivate thrombin, in contrast to heparin.

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A 35-year-old man attends the Haematology Clinic having found a lump in his neck. He feels generally unwell but has no past history. There is axillary lymphadenopathy and splenomegaly. Full blood count shows:

WCC 16 × 10^3/mm^3; Hb 8.3 g/dl; platelets 106 × 10^3/mm^3. The blood film and bone marrow aspirate show lymphoblasts.

Which one of the following is the most useful test to make a definitive diagnosis?

A	Cytogenetic analysis
B	Lymph node biopsy
C	Total-body computed tomography (CT) scan
D	Total-body positron-emission tomography (PET) scan
E	Immunophenotyping

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Previous Question | Skip Question

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E Immunophenotyping

This young man has lymphoblasts in the bone marrow. Therefore, the best way to make a definitive diagnosis is by blood immunophenotyping. This will characterise the lymphoblasts as immature B-cells. It will distinguish between mature B-cell neoplasms such as lymphomas, as well as other immature blood cancers such as acute myeloid leukaemia.

A Cytogenetic analysis

Cytogenetic analysis is incorrect. Cytogenetic analysis is very important in the risk stratification of ALL,ie giving an indication of the likely chances of long-term survival.

B Lymph node biopsy

A lymph node biopsy is incorrect. Lymph node biopsy is not required; there is marrow disease which has already been done. Immunophenotyping therefore can establish the diagnosis.

C Total-body computed tomography (CT) scan

A CT scan is incorrect. CT scan will just show the extent of the lymphadenopathy and will not help to make an underlying diagnosis.

D Total-body positron-emission tomography (PET) scan

A PET scan is incorrect. PET scan may show some activity in the lymph nodes, but again will not give an underlying diagnosis.

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A 25-year-old woman presents 2 days postpartum with sudden onset left-sided chest pain and shortness of breath. She is tachycardic and has a respiratory rate of 24 breaths per minute. She is started on intravenous unfractionated heparin. She is started on warfarin the day after when a ventilation/perfusion (*V*/*Q*) scan confirms a pulmonary embolus, but is slow to reach therapeutic anticoagulation and heparin is therefore continued. Eight days into the treatment she requires increasing doses of heparin to maintain a therapeutic activated partial thromboplastin time (APTT). On day ten she has a pale, pulseless and painful right foot.

Which one of the following diagnostic laboratory results supports your clinical diagnosis?

A	A low factor VII assay
B	A low platelet count of 50 $\times 10^9$/l
C	A low protein C level of 43%
D	An APTT ratio of 1.7
E	A prolonged international normalised ratio (INR)

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B A low platelet count of 50 $\times 10^9$/l

This woman has received unfractionated heparin. By day ten, she has a pale, pulseless and painful right foot, which would be indicative of an arterial embolic event. This is despite heparin anticoagulation. Therefore, this is suspicious for heparin-induced thrombocytopenia, and a falling platelet count would be supportive of the clinical diagnosis.

C A low protein C level of 43%

A low protein C level of 43% is incorrect. A low protein C level of 43% has nothing to do with the suspected diagnosis of heparin-induced thrombocytopenia. It should be noted, however, that protein C levels will fall with warfarin therapy, because protein C is a vitamin-K-dependent factor.

A A low factor VII assay

A low factor VII assay is incorrect. A low factor VII assay would predispose to bleeding, and not a new arterial thrombotic event.

D An APTT ratio of 1.7

An APTT ratio of 1.7 is incorrect. An APTT ratio of 1.7 would not be supportive of the clinical diagnosis of heparin-induced thrombocytopenia.

E A prolonged international normalised ratio (INR)

Prolonged INR is incorrect. Prolonged INR would not be suggestive of heparin-induced thrombocytopenia.

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A 45-year-old publican comes to the Endocrinology Clinic for review. He presents with tiredness, polyuria, polydipsia and pain in his left hip and right knee. He admits to drinking 2 pints of beer per day and says that he has drunk more alcohol in the past. There have been problems with libido, although he puts this down to strain in his relationship because of running his business. He takes Ramipril for hypertension but is on no other regular medication. His BP is 144/70 mmHg, pulse is 75/min and regular. He looks tanned. His BMI is 33. Movement of the left hip and right knee are limited by pain and stiffness.

Investigations:

Hb	14.9 g/dl
WCC	7.0 x 10^9/l
PLT	203 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	112 micromol/l
ALT	89 U/l

Which of the following investigations would be most likely to deliver the underlying diagnosis?

A	Fasting plasma glucose
B	Immunoglobulin electrophoresis
C	Serum calcium
D	Transferrin saturation
E	USS liver

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D	Transferrin saturation

Iron Overload Transferrin saturation is the most appropriate test to look for evidence of iron overload.The abnormal ALT level raises the possibility of chronic liver disease, the tanned appearance is suggestive of iron deposition, and the polyuria may be related to hyper-glycaemia. Putting these features together, coupled with the loss of libido, suggests an underlying diagnosis of haemochromatosis. Fasting transferrin saturation would be raised in this condition.

A	Fasting plasma glucose

Fasting plasma glucose is incorrect. Fasting plasma glucose may of course confirm diabetes, but not the underlying cause of the diabetes.

B	Immunoglobulin electrophoresis

Immunoglobulin electrophoresis is incorrect. Immunoglobulin electrophoresis will not help, because haemochromatosis is not a plasma cell disorder.

C	Serum calcium

Serum calcium is incorrect. Serum calcium will not be helpful, as this will not link into the possible diagnosis of haemochromatosis.

E	USS liver

USS liver is incorrect. An ultrasound scan of the liver may be required to look for any underlying cirrhosis, but this will not point to an underlying aetiology such as haemochromatosis.

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Which one of the following is an appropriate use of blood products?

A	Injection of prothrombin complex concentrate to reverse over-warfarinisation in a patient with international normalised ratio (INR) of eight and no bleeding
B	Transfusion of cryoprecipitate in a patient with disseminated intravascular coagulation (DIC) and fibrinogen of 0.5 g/l
C	Transfusion of fresh frozen plasma to correct hypovolaemia after haemorrhage
D	Transfusion of high-dose intravenous gamma globulin for the initial treatment of warm autoimmune haemolytic anaemia
E	Transfusion of platelet concentrate in a case of immune thrombocytopaenic purpura with a platelet count of 15 × 10^9 per litre with purpura of the lower limbs

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Previous Question | Skip Question

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8:11
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Explanation

B	Transfusion of cryoprecipitate in a patient with disseminated intravascular coagulation (DIC) and fibrinogen of 0.5 g/l

Transfusion of cryoprecipitate in a patient with DIC and fibrinogen of 0.5 g/l is an appropriate use of this blood product. A major indication for cryoprecipitate is in this situation.

A	Injection of prothrombin complex concentrate to reverse over-warfarinisation in a patient with international normalised ratio (INR) of eight and no bleeding

Injection of prothrombin complex concentrate (PCC) to reverse over-warfarinisation in a patient with international normalised ratio (INR) of eight and no bleeding is incorrect. PCC is given to reverse over-warfarinisation in a patient with a high INR with life-threatening bleeding. In this situation where there is no bleeding, the warfarin simply needs to be withheld, with consideration given to also administering vitamin K.

C	Transfusion of fresh frozen plasma to correct hypovolaemia after haemorrhage

Transfusion of fresh frozen plasma to correct hypovolaemia after haemorrhage is incorrect. If someone has developed hypovolemia after haemorrhage, they need a transfusion of packed red cells, not fresh frozen plasma.

D	Transfusion of high-dose intravenous gamma globulin for the initial treatment of warm autoimmune haemolytic anaemia

Transfusion of high-dose intravenous gamma globulin for the initial treatment of warm autoimmune haemolytic anaemia is inc
The initial treatment of auto-immune haemolytic anaemia is with steroids, not with intravenous gamma globulin

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(INR) of eight and no bleeding is incorrect. PCC is given to reverse over-warfarinisation in a patient with a high INR with life-threatening bleeding. In this situation where there is no bleeding, the warfarin simply needs to be withheld, with consideration given to also administering vitamin K.

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Transfusion of fresh frozen plasma to correct hypovolaemia after haemorrhage is incorrect. If someone has developed hypovolemia after haemorrhage, they need a transfusion of packed red cells, not fresh frozen plasma.

D	Transfusion of high-dose intravenous gamma globulin for the initial treatment of warm autoimmune haemolytic anaemia

Transfusion of high-dose intravenous gamma globulin for the initial treatment of warm autoimmune haemolytic anaemia is incorrect. The initial treatment of auto-immune haemolytic anaemia is with steroids, not with intravenous gamma globulin.

E	Transfusion of platelet concentrate in a case of immune thrombocytopaenic purpura with a platelet count of 15 × 10^9 per litre with purpura of the lower limbs

Transfusion of platelet concentrate in a case of immune thrombocytopaenic purpura with a platelet count of 15 × 10^9 per litre with purpura of the lower limbs is incorrect. The initial treatment of immune thrombocytopaenia purpura is with steroids, not platelet concentrates. Because of immune consumption of the platelets, they will not lastvery long in the system at all, and hence are only ever indicated in cases of life-threatening bleeding associated with immune thrombocytopaenia.

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A 52-year-old woman is referred to the oncology clinic by the local general surgeon. She has undergone mastectomy for carcinoma of the right breast.

Which one of the following factors is associated with a poor prognosis in patients with breast cancer?

A	Low-grade tumour
B	Negative lymph node status
C	Oestrogen-receptor-positive tumour
D	Progesterone-receptor-positive tumour
E	Young age

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Previous Question | Skip Question

Calculator

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E	Young age

Breast cancer is the most common cancer in non-smoking women. Poor prognostic factors for breast cancer include: high-grade tumour, positive lymph node status, oestrogen-receptor-negative tumour, progesterone-receptor-negative tumour, young age (< 40 years), premenopausal at diagnosis and increased tumour size. Therefore low grade tumour, negative lymph node status, oestrogen-receptor-positive tumour and progesterone-receptor-positive tumour are incorrect as they are all good prognostic factors.

The UK breast screening programme and improvements in therapy have improved survival rates, and more conservative approaches to surgery have vastly improved the psychosexual well-being in women who suffer from the disease. Radiotherapy is given to the conserved breast after wide local excision to reduce the risk of local recurrence; and after mastectomy if there are risk factors such as proximity to surgical margins or lymph node metastases. Adjuvant radiotherapy reduces the risk of local recurrence by 25% and improves survival by 3%. Pre-menopausal patients may be considered for endocrine therapy via oophorectomy, radiation-induced ovarian ablation or the use of a gonadotrophin-releasing hormone (GnRH) analogue, with additional tamoxifen, anti-oestrogens or progesterone. Post-menopausal patients may be given tamoxifen, progesterone or aromatase inhibitors. Chemotherapy is considered for those patients who are unlikely to respond to or fail to respond to hormonal therapy, or are at high risk of recurrence despite other therapies.

A	Low-grade tumour

Low-grade tumour is incorrect. High-grade tumour is associated with poor prognosis in breast cancer.

B	Negative lymph node status

Negative lymph node status is incorrect. Positive lymph node status

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proximity to surgical margins or lymph node metastases. Adjuvant radiotherapy reduces the risk of local recurrence by 25% and improves survival by 3%. Pre-menopausal patients may be considered for endocrine therapy via oophorectomy, radiation-induced ovarian ablation or the use of a gonadotrophin-releasing hormone (GnRH) analogue, with additional tamoxifen, anti-oestrogens or progesterone. Post-menopausal patients may be given tamoxifen, progesterone or aromatase inhibitors. Chemotherapy is considered for those patients who are unlikely to respond to or fail to respond to hormonal therapy, or are at high risk of recurrence despite other therapies.

A Low-grade tumour

Low-grade tumour is incorrect. High-grade tumour is associated with poor prognosis in breast cancer.

B Negative lymph node status

Negative lymph node status is incorrect. Positive lymph node status is associated with poor prognosis in breast cancer.

C Oestrogen-receptor-positive tumour

Oestrogen-receptor-positive tumour is incorrect. Oestrogen-receptor-negative tumour is associated with poor prognosis in breast cancer.

D Progesterone-receptor-positive tumour

Progesterone-receptor-positive tumour is incorrect. Progesterone-receptor-negative tumour is associated with poor prognosis in breast cancer.

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A 75-year-old heavy smoker of 40 cigarettes per day is admitted to the Emergency Department. He has a past history of hypertension and atrial fibrillation. Over the past few months he has suffered a chronic cough and has lost approximately 2 stone (about 12.5 kg) in weight. He has been increasingly drowsy over the past few days and his relatives were unable to rouse him this morning. On examination he has a GCS of 6 and you notice that he has been incontinent of urine and faeces.

What diagnosis fits with this clinical picture?

A	Cerebral meningioma
B	Embolic stroke
C	Glioblastoma multiforme
D	Metastatic carcinoma with cerebral metastases
E	Subarachnoid haemorrhage

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8:17

Explanation

D	Metastatic carcinoma with cerebral metastases

This man is a heavy smoker with a history of chronic cough and weight loss over the past few months, raising the possibility of bronchial carcinoma. The picture of progressively deteriorating conscious level points towards increasing cerebral oedema, almost certainly due to cerebral metastases from the bronchial tumour.

This type of presentation is an indication for urgent computed tomography (CT) scanning. Treatment may include dexamethasone with or without mannitol IV to reduce cerebral oedema. Often deterioration of this nature is attributable to haemorrhage into an enlarging cerebral metastasis. Even if there is an initial response to medical treatment and conscious level improves, prognosis with this type of presentation is extremely poor.

Around 50% of intracranial tumours are due to metastases, around 35% are due to malignant primary brain tumours (astrocytoma or oligodendroglioma), and around 10% are caused by benign brain tumours such as meningioma or neurofibroma.

B	Embolic stroke

Embolic stroke is incorrect. Although embolic stroke is a possible alternative diagnosis given the history of atrial fibrillation, presentation would have been more acute.

A	Cerebral meningioma

Cerebral meningioma is incorrect. Cerebral meningioma is less common than metastatic carcinoma with cerebral metastases.

C	Glioblastoma multiforme

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Glioblastoma multiforme is incorrect. Primary brain tumours are less common than cerebral metastases.

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A 72-year-old man presents to the Haematology Clinic complaining of severe headaches and pain in his fingers and toes, particularly when he is exposed to excess heat. His GP has noticed a significantly elevated platelet count. He has a history of raised blood pressure for which he takes ramipril 10 mg daily, but nil else of note. On examination his BP is 152/80 mmHg, pulse is 78/min and regular, there are no abnormal findings on general physical examination. Investigations:

Hb	179 g/l
WCC	9.1 x 10^9/l
PLT	875 x 10^9/l (>2x upper limit of normal on all three occasions it was measured over the past 8 weeks)
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	123 micromol/l
ALT	62 U/l

Which of the following investigations is most likely to be positive with respect to confirming primary polycythaemia?

A	Bone marrow biopsy
B	JAK-2 mutation analysis
C	Platelet aggregation studies
D	Serum urate
E	Vitamin B12 levels

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B JAK-2 mutation analysis

This man has evidence of a raised haemoglobin and a thrombocytosis, suggesting an underlying primary polycythaemia. The JAK-2 mutation is present in greater than 95% of patients with primary polycythaemia and can be done on a peripheral blood sample.

A Bone marrow biopsy

Bone marrow biopsy is incorrect. Bone marrow biopsy is usually unnecessary if patients have typical features of polycythaemia on the full blood count, and are positive for the JAK-2 mutation.

C Platelet aggregation studies

Platelet aggregation studies is incorrect. Platelet aggregation studies is not a test used in polycythaemia investigation.

D Serum urate

Serum urate is incorrect. Serum urate can be raised, reflecting increased cell turnover, but this is not helpful in defining the diagnosis of primary polycythaemia.

E Vitamin B12 levels

Vitamin B12 levels is incorrect. Vitamin B12 levels can be raised, but this is not indicative in its own right of primary polycythaemia.

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A 24-year-old woman presents to the Emergency Department with severe tiredness, a petechial rash and extensive bruising. Blood work up reveals severe anaemia; she has a markedly abnormal blood picture with anaemia, massively elevated lymphocyte count with a number of B-lymphocyte pre-cursors, and thrombocytopaenia. She is diagnosed with precursor B-cell acute lymphoblastic leukaemia (ALL).

Which of the following is associated with a good prognosis in ALL?

A	Myeloid antigen expression
B	Presentation in adulthood
C	t(9;22)
D	t(12;21)
E	t(v11q23)

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D	t(12;21)

t(12;21) is seen usually in children and is associated with a good prognosis, with cure rates in childhood greater than 90%.

A	Myeloid antigen expression

Myeloid antigen expression is incorrect. Myeloid antigen expression may suggest a condition called biphenotypic acute leukaemia, which in general is not associated with a good prognosis.

B	Presentation in adulthood

Presentation in adulthood is incorrect. Presentation of ALL in adulthood is generally less good than when it presents in childhood.

C	t(9;22)

t(9;22) is incorrect. t(9,22) is the Philadelphia chromosome and results in a poorer prognosis than when this cytogenetic abnormality is not present.

E	t(v11q23)

t(v11q23) is incorrect. t(v11q23) results in MLL gene re-arrangements which confer a poor prognosis in ALL.

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A 27-year-old White man presents to the Emergency Department with right upper quadrant pain. He admits on further questioning to 'always feeling tired', He has no past medical history of note and does not know his family history as he is adopted. His BP is 165/80 mmHg, he looks pale, jaundiced and is in pain. Abdominal exam is consistent with cholecystitis and his BMI is 24. Investigations:

Hb	100 g/l
WCC	13.1 x 10^9/l
PLT	203 x 10^9/l
Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	110 micromol/l
ALT	130 U/l
Alkaline phosphatase	435 U/l
Bilirubin	83 micromol/l
Abdominal ultrasound	Stones visualised within the gall bladder

Given the suspected diagnosis, which of the following tests is most useful in determining the underlying cause of his presentation?

A	Blood cultures
B	Blood film
C	Cold agglutinins
	test

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'always feeling tired', He has no past medical history of note and does not know his family history as he is adopted. His BP is 165/80 mmHg, he looks pale, jaundiced and is in pain. Abdominal exam is consistent with cholecystitis and his BMI is 24. Investigations:

Hb	100 g/l
WCC	13.1 x 10^9/l
PLT	203 x 10^9/l
Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	110 micromol/l
ALT	130 U/l
Alkaline phosphatase	435 U/l
Bilirubin	83 micromol/l
Abdominal ultrasound	Stones visualised within the gall bladder

Given the suspected diagnosis, which of the following tests is most useful in determining the underlying cause of his presentation?

A	Blood cultures
B	Blood film
C	Cold agglutinins
D	Coombs test
E	Haemoglobin electrophoresis

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A	Blood cultures
B	Blood film
C	Cold agglutinins
D	Coombs test
E	Haemoglobin electrophoresis

Explanation

B	Blood film

This man has evidence of obstructive jaundice, with stones within the gall bladder. He also has evidence of cholecystitis and is anaemic. The combination of anaemia with gall stones should suggest hereditary spherocytosis. A blood film will reveal numerous spherocytes.

A	Blood cultures

Blood cultures is incorrect. Blood cultures will not help in determining the underlying cause for his presentation, and there is no suggestion of systemic infection.

C	Cold agglutinins

Cold agglutinins is incorrect. Cold agglutinins are antibodies that bind to red cells at cold temperatures.

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8:22
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A 17-year-old girl presents to the Emergency Department with a single painless cervical lymph node. She has no other significant symptoms apart from a chronic cough for which her GP has recently prescribed a salbutamol inhaler. On examination she has a 4-cm-diameter cervical lymph node. Her BP is 128/74 mmHg, her pulse is 80 bpm and regular, and she is apyrexial.

Investigations;

Hb	109 g/l
WCC	11.9 x 10^9/l
PLT	203 x 10^9/l
ESR	75 mm/h
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	110 µmol/l
CXR	Gross mediastinal lymphadenopathy

Which one of the following is the most likely diagnosis?

A	Acute myeloid leukaemia
B	Chronic myeloid leukaemia
C	Hodgkin's lymphoma
D	Non-Hodgkin's B-cell lymphoma
E	mphoma

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8:22
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pulse is 80 bpm and regular, and she is apyrexial.

Investigations;

Hb	109 g/l
WCC	11.9 x 10^9/l
PLT	203 x 10^9/l
ESR	75 mm/h
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	110 µmol/l
CXR	Gross mediastinal lymphadenopathy

Which one of the following is the most likely diagnosis?

A	Acute myeloid leukaemia
B	Chronic myeloid leukaemia
C	Hodgkin's lymphoma
D	Non-Hodgkin's B-cell lymphoma
E	T-cell lymphoma

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Audio
Video
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C Hodgkin's lymphoma

This patient has significant mediastinal lymphadenopathy on a chest X-ray, associated with a cervical lymph node. This presentation is typical of Hodgkin's lymphoma. She requires an urgent lymph node biopsy.

A Acute myeloid leukaemia

Acute myeloid leukaemia is incorrect. Acute myeloid leukaemia would cause anaemia, blasts in the peripheral blood with a thrombocytopaenia. It would not be associated with mediastinal or cervicallymphadenopathy.

B Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. Chronic myeloid leukaemia would be associated with a very raised white cell count. It would not be associated with lymphadenopathy.

D Non-Hodgkin's B-cell lymphoma

Non-Hodgkin's B-cell lymphoma is incorrect. Non-Hodgkin's lymphoma is a possible differential diagnosis. However, this young woman's presentation is entirely typical of Hodgkin's disease which would be more common than rarer forms of non-Hodgkin's disease. However, a lymph node biopsy would be critical in order to make a definitive diagnosis.

E T-cell lymphoma

T-cell lymphoma is incorrect. The clinical scenario presented is much more likely to be Hodgkin's disease in terms of likely prevalen liseases. Once again, however, a full lymph node biopsy i s indicated to confirm the definitive diagnosis.

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You are asked to see a 45-year-old man who is haemodynamically compromised and you plan to insert a right subclavian line. He has a body mass index (BMI) of 38 kg/m^2.

Where is the correct position for central venous cannulation?

A	0.5 cm under the midpoint of the clavicle and 1 cm laterally
B	1 cm under the midpoint of the clavicle and 0.5 cm laterally
C	1 cm under the midpoint of the clavicle and 1 cm laterally
D	2 cm under the midpoint of the clavicle and 1 cm laterally
E	2.5 cm under the midpoint of the clavicle and 2 cm laterally

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Previous Question Skip Question

Calculator

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Explanation

D	2 cm under the midpoint of the clavicle and 1 cm laterally

2 cm under the midpoint of the clavicle and 1 cm laterally is the correct position for centralvenous cannulation in obese patients. In contrast, in thin patients, the standard position for insertion is 1 cm under the mid-point of the clavicle and 0.5 cm laterally.

Internal jugular vein cannulation is now the preferred choice for central venous catheterisation, and insertion under ultrasound guidance is associated with a much lower rate of complications than subclavian line insertion. The major hazard of the subclavian approach is arterial puncture, as the artery lies close to the vein, and direct ultrasound visualisation can be difficult.

C	1 cm under the midpoint of the clavicle and 1 cm laterally

1 cm under the mid-point of the clavicle and 1 cm laterally is incorrect. 2 cm under the midpoint of the clavicle and 1 cm laterally is the correct position for central venous cannulation in obese patients. In contrast, in thin patients, the standard position for insertion is 1 cm under the mid-point of the clavicle and 0.5 cm laterally.

A	0.5 cm under the midpoint of the clavicle and 1 cm laterally

0.5 cm under the midpoint of the clavicle and 1 cm laterally is incorrect. 2 cm under the midpoint of the clavicle and 1 cm laterally is the correct position for central venous cannulation in obese patients. In contrast, in thin patients, the standard position for insertion is 1 cm under the mid-point of the clavicle and 0.5 cm laterally.

B	1 cm under the midpoint of the clavicle and 0.5 cm

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A 76-year-old man presents to his GP with increasing lumbar spine pain, lethargy and tiredness. Lumbar spine X-ray reveals areas of collapse suspicious of pathological fractures. Laboratory testing reveals anaemia with haemoglobin of 85 g/l and urinary Bence Jones protein is identified. Skeletal survey reveals a number of suspicious areas including the lumbar spine, both femurs and the right humerus. Multiple myeloma is confirmed.

Which one of the following most accurately represents the median survival prognosis for unselected patients with multiple myeloma?

A	1 year
B	2 years
C	4 years
D	5 years
E	5-10 years

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Previous Question Skip Question

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E 5-10 years

The median survival has increased over the last 20 years, and now in unselected patients is at least 5-10 years. Some patients will therefore survive longer, with survivals greater than 10 years. This is due to an increase in the number of treatment modalities available to patients with multiple myeloma, including autologous stem cell transplantation, thalidomide, proteasome inhibitors like bortezomib and other drugs like lenalidomide.

D 5 years

5 years is incorrect. The median survival prognosis is 5-10 years.

A 1 year

1 year is incorrect. The median survival prognosis is 5-10 years.

B 2 years

2 years is incorrect. The median survival prognosis is 5-10 years.

C 4 years

4 years is incorrect. The median survival prognosis is 5-10 years.

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A 58-year-old man presents to the clinic with indigestion which has increased in severity over the past 2 months. He is a smoker of 20 cigarettes per day, and drinks three large whiskies per day. He is referred for urgent endoscopy, which reveals a T2 N0 adenocarcinoma of the lower third of the oesophagus.

Other investigations:

Hb	13.5 g/dl
WCC	8.0 x 10^9/l
PLT	192 x 10^9/l
Na^+	139 mmol/l
K^+	4.3 mmol/l
Creatinine	110 micromol/l
ALT	35 U/l

Which of the following is the most appropriate treatment?

A	Chemoradiotherapy then surgery
B	Oesophageal stenting
C	Palliative radiotherapy
D	Photodynamic therapy
E	Surgery

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Explanation

A	Chemoradiotherapy then surgery

This patient has a potentially resectable oesophageal cancer; as such, curative intervention is indicated. A study of 1085 patients who underwent oesophagectomy surgery showed a 4% operative mortality rate and a 23% survival rate. For patients who had preoperative chemoradiotherapy, the prognosis improved to 48%; therefore, chemoradiotherapy then surgery is preferred to surgery alone.

E	Surgery

Surgery is incorrect. A study of 1085 patients who underwent oesophagectomy surgery showed a 4% operative mortality rate and a 23% survival rate. For patients who had preoperative chemoradiotherapy, the prognosis improved to 48%; therefore, chemoradiotherapy then surgery is preferred to surgery alone.

B	Oesophageal stenting

Oesophageal stenting is incorrect. Stenting is a purely palliative procedure in the case of obstruction and dysphagia and will not impair the growth of the tumour.

C	Palliative radiotherapy

Palliative radiotherapy is incorrect. Radiotherapy may be of use in palliation, as may photodynamic therapy, brachytherapy, chemotherapy, electrocautery, photodynamic therapy or laser ablation.

D	Photodynamic therapy

Photodynamic therapy is incorrect. Photodynamic therapy may be

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A 67-year-old male presents with a 3-week history of progressive headache and vomiting in the mornings. You suspect he may have glioblastoma multiforme and arrange appropriate imaging.

Which is the most likely location of glioblastoma multiforme within the brain?

A	Basal ganglia
B	Cerebellum
C	Cerebrum
D	Pons
E	Ventricle wall

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Previous Question Skip Question

Calculator

Normal Values

Annotation Stop Share

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Explanation

C Cerebrum

Glioblastoma multiforme occur most often in the subcortical white matter of the cerebral hemispheres; most frequently affected sites are in the temporal (31%), parietal (24%), frontal (23%) and occipital (16%) lobes. A combined frontotemporal location is particularly common.

B Cerebellum

Cerebellum is incorrect. For the reasoning as described, the most likely location is the cerebrum.

A Basal ganglia

Basal ganglia is incorrect. For the reasoning as described, the most likely location is the cerebrum.

D Pons

Pons is incorrect. For the reasoning as described, the most likely location is the cerebrum.

E Ventricle wall

Ventricle wall is incorrect. For the reasoning as described, the most likely location is the cerebrum.

540

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A 20-year-old man has a painful swollen knee, a prolonged activated partial thromboplastin time (APTT), a prolonged bleeding time and a normal prothrombin time.

Which one of the following is the most likely diagnosis?

A	Anaphylactoid (Henoch–Schönlein) purpura
B	Factor VII deficiency
C	Haemophilia A
D	Salicylate poisoning
E	Type III von Willebrand's disease

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Previous Question | Skip Question

Calculator

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Explanation

E	Type III von Willebrand's disease

This man has a painful swollen knee that probably indicates a haemarthrosis. The partial thromboplastin time is prolonged, as is the bleeding time. The prothrombin time is normal. This cannot be haemophilia A, because this actually gives a normal bleeding time. Therefore, the only correct answer that it can be is type III von Willebrand's disease, which is the severe form of the disease, caused by almost total absence of von Willebrand factor. This will lead to a prolonged bleeding time, because the complete lack of von Willebrand factor will not allow platelets to adhere to the endothelium. Factor VIII levels are also reduced in this condition, which will lead to a prolonged APTT.

A	Anaphylactoid (Henoch–Schönlein) purpura

Anaphylactoid (Henoch–Schönlein) purpura is incorrect. This would not cause the prolonged coagulation times.

B	Factor VII deficiency

Factor VII deficiency is incorrect. Factor VII deficiency would lead to a prolonged prothrombin time.

C	Haemophilia A

Haemophilia A is incorrect. Although haemophilia A could obviously lead to a haemarthrosis, it would not be associated with a prolonged bleeding time. This is an important fact to note about haemophilia A and B. This is because there is normal adhesion of platelets to the endothelium, which is the predominant factor when assessing the bleeding time.

D	[illegible]e poisoning

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8:31
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A 17-year-old boy was brought to the Emergency Department suffering from excessive bleeding after extraction of a diseased tooth at the dentist. On further questioning he reports suffering easy bruising for as long as he can remember, but never thought to see the doctor as his mother suffers from the same problem. On examination there are bruises on his legs and forearms from falling over and the base of his tooth extraction is oozing blood.

Investigations:

Hb	129 g/l
WCC	6.1 x 10^9/l
PLT	197 x 10^9/l
Na^+	139 mmol/l
K^+	4.4 mmol/l
Creatinine	100 µmol/l
APTT	45s
PT	15s

Which one of the following is the most likely diagnosis?

A	Factor VIII deficiency
B	Factor IX deficiency
C	Factor XI deficiency
D	Fibrinogen deficiency
E	von Willebrand's disease

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8:32
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Explanation

E	von Willebrand's disease

The most likely diagnosis here is von Willebrand's disease. We are told that both this 17-year-old boy and his mother appear to be suffering from the same problem of easy bruising, as well as excessive bleeding after a dental extraction. He has a prolonged APTT. The fact that his mother is also affected would suggest an autosomal disease such as von Willebrand's disease. This is associated with mucous membrane bleeding, such as nose bleeds and menorrhagia. It is also associated with excessive bleeding following procedures and dental extractions.

A	Factor VIII deficiency

Factor VIII deficiency is incorrect. This is haemophilia A and is an inherited X-linked condition. It would not therefore be expected for his mother to be affected.

B	Factor IX deficiency

Factor IX deficiency is incorrect. This is haemophilia B and is an inherited X-linked condition. It would not therefore be expected for his mother to be affected.

C	Factor XI deficiency

Factor XI deficiency is incorrect. Factor XI deficiency is inherited in an autosomal recessive pattern, meaning that both men and women are affected. However, von Willebrand's disease is much more common than factor XI deficiency.

D	F…gen deficiency

Fibrinogen deficiency is incorrect. Fibrinogen deficiency is a very

Annotation
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A 72-year-old man who has received thrombolysis for an acute stroke suffers a catastrophic gastrointestinal haemorrhage. During the last 60 minutes he has suffered a 400 ml haematemesis and has fresh blood rectally. You elect to reverse his alteplase.

What is the optimal way to do this?

A	Factor VII
B	Factor VIII
C	FFP
D	Platelets
E	Prothrombin complex concentrate

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Previous Question Skip Question

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E	Prothrombin complex concentrate

Explanation

C	FFP

This man has suffered major bleeding following thrombolysis for an acute stroke with alteplase. The British Committee for Standards in Haematology (BCSH) has issued a guideline that discusses the management of bleeding in patients on anti-thrombotic agents. Alteplase is a tissue plasminogen activator. It converts plasminogen into plasmin, which then degrades fibrin. The BCSH guidelines recommend administering FFP, along with intravenous tranexamic acid. Tranexamic acid is an anti-fibrinolytic and inhibits the activation of plasminogen to plasmin.

A	Factor VII

Factor VII is incorrect. BCSH guidelines recommend administering FFP, along with intravenous tranexamic acid.

B	Factor VIII

Factor VIII is incorrect. BCSH guidelines recommend administering FFP, along with intravenous tranexamic acid.

D	Platelets

Platelets is incorrect. Administering platelets is not indicated unless there is associated thrombocytopaenia.

E	Prothrombin complex concentrate

Prothrombin complex concentrate is incorrect. Prothrombin complex concentrate is used for the reversal of bleeding due to

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A 38-year-old man presents with an acute anaemia. Hb 7.2 g/litre, haptoglobin< 0.05 g/litre, reticulocytes 320 × 10^9/litre (reference 25 × 10^9/litre to 85 × 10^9/litre).

Which one of the following is the most likely form of the anaemia?

A	Iron deficiency anaemia
B	Haemolytic anaemia
C	Aplastic anaemia
D	Pernicious anaemia
E	Folic acid deficiency anaemia

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Previous Question Skip Question

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B	Haemolytic anaemia

We have a young man who has an acute anaemia. Reticulocytes are raised. When patients have anaemia with a reticulocytosis, this indicates either bleeding or haemolysis. A raised bilirubin level will point towards haemolysis, whereas a normal bilirubin would point to bleeding. In this situation, we have been told that there is a low haptoglobin level. Haptoglobin is a protein that is found normally in plasma that binds free haemoglobin. The haptoglobin-haemoglobin complex will then be removed by the spleen. Therefore, low haptoglobin levels will signify intravascular haemolytic anaemia.

A	Iron deficiency anaemia

Iron deficiency anaemia is incorrect. The reticulocyte count is usually reduced in iron deficiency anaemia, indicating inadequate red cell production.

C	Aplastic anaemia

Aplastic anaemia is incorrect - a low reticulocyte count would be expected in this situation.

D	Pernicious anaemia

Pernicious anaemia is incorrect. This would cause a reduced reticulocyte count, with normal haptoglobin levels.

E	Folic acid deficiency anaemia

Folic acid deficiency anaemia. This would be associated with a reduced reticulocyte count. A raised reticulocyte count with a reduced haptoglobin level indicates haemolytic anaemia.

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A 54-year-old male presents to his GP with jaundice and is found to have a painless enlargement of the gallbladder (Courvoisier's law).

Which one of the following is the most likely diagnosis?

A	Carcinoma of the ampulla of Vater
B	Carcinoma of the gallbladder
C	Gallstones in the cystic duct
D	Liver cirrhosis
E	Progressive hepatitis B

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8:36

A	Carcinoma of the ampulla of Vater

Courvoisier's law: If the malignant obstruction is below the level of the cystic duct, the gallbladder is distended and may be palpable.

The urine is dark and the stools pale; a film of blood on the pale stool may give it a silvery colour ('silver stools'). An ultrasound or CT scan examination will reveal dilatation of the biliary tree and may demonstrate the level of the obstruction. Ultrasound-guided percutaneous needle biopsy may be employed to provide a histological diagnosis.

Bile duct carcinoma frequently causes obstruction at the porta hepatis and, consequently, at laparotomy the extrahepatic biliary tract appears non-dilated. Even if an operative cholangiography is performed, the contrast medium frequently fails to pass the obstruction and fill the dilated intrahepatic biliary tree.

It is important to establish the diagnosis precisely before surgery is contemplated by performing an ERCP (endoscopic retrograde cholangiopancreatography) or PTC (percutaneous transhepatic cholangiography). This is particularly important because most of these patients are best treated by endoscopic or percutaneous biliary stents rather than by surgery.

C	Gallstones in the cystic duct

Gallstones in the cystic duct is incorrect. Gallstones are painful and typically cause symptoms after ingesting a fatty meal.

B	Carcinoma of the gallbladder

Carcinoma of the gallbladder is incorrect. Gallbladder carcinoma is usually painful, but may cause similar symptoms (jaundice, enlarged gallbladder) so it may be impossible to distinguish clinically from ampullary carcinoma.

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D	Liver cirrhosis

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B Carcinoma of the gallbladder

Carcinoma of the gallbladder is incorrect. Gallbladder carcinoma is usually painful, but may cause similar symptoms (jaundice, enlarged gallbladder) so it may be impossible to distinguish clinically from ampullary carcinoma.

D Liver cirrhosis

Liver cirrhosis is incorrect. Liver cirrhosis may cause jaundice and if acute may cause some hepatomegaly, but in the chronic condition is associated with a shrunken nodular liver.

E Progressive hepatitis B

Progressive hepatitis B is incorrect. Progressive hepatitis B may cause an acute tender hepatomegaly, but would not cause enlargement of the gallbladder.

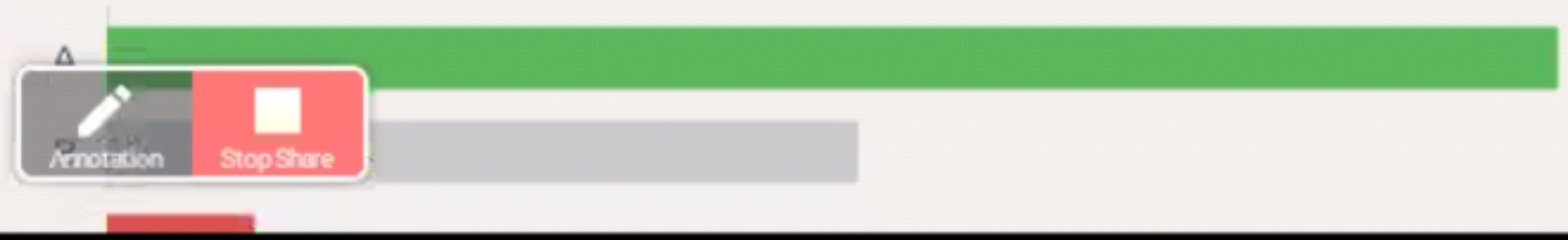
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You are asked to see a 25-year-old white man who experienced marked weakness and dyspnoea 4 days after being admitted for a compound arm fracture after falling from a tree. Estimated blood loss from the initial fracture episode was 600 ml and the patient was transfused with one unit of packed erythrocytes. The initial crossmatch was reported as compatible by the transfusion service. The patient has never been transfused before this incident and has no other serious medical illnesses. The patient's arm fracture was treated with surgical pinning and prophylactic antibiotics consisting of a cephalosporin IV every 12 h. On examination, the patient is febrile and mildly tachycardic, with no evidence of wound infection or compartment syndrome. Laboratory data show a haematocrit of 15%, a raised reticulocyte count and total bilirubin of 70 µmol/l with a conjugated bilirubin of 9 µmol/l. The peripheral smear shows many spherocytes. No haemoglobinaemia or haemoglobinuria is seen on visual inspection of the plasma and urine. The transfusion service reports that the direct Coombs' test is now strongly positive using anti-IgG and only weakly positive with anti-C3d antisera. They further report that routine compatibility tests show no new erythrocyte antibodies in the patient's serum and that, when they attempted to elute antibody from the patient's red blood cells (RBCs) and test against normal RBCs, the results were negative.

What is the most likely diagnosis?

A	Auto-immune haemolytic anaemia of the cold antibody type
B	Auto-immune haemolytic anaemia of the warm antibody type
C	Delayed haemolytic transfusion reaction
D	Drug induced immune haemolytic anaemia

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D	Drug-induced immune haemolytic anaemia

This man has evidence of haemolysis, with a raised reticulocyte count, as well as a raised level of unconjugated bilirubin. There is blood film evidence of haemolysis, showing spherocytes. There is no haemoglobinaemia or haemoglobinuria, demonstrating that there is no intravascular haemolysis occurring.

The last couple of lines of the question essentially can be summarised by saying that the direct Coomb's test is now IgG positive, but the antibody screen is entirely negative. This, therefore, is against auto-immune haemolytic anaemia, or a transfusion reaction, because in these cases the antibody screen would be expected to be positive. Therefore, the most likely answer is a drug-induced haemolytic anaemia in response to his cephalosporin antibiotic therapy. The anaemia should begin to improve after drug withdrawal.

B	Auto-immune haemolytic anaemia of the warm antibody type

Auto-immune haemolytic anaemia of the warm antibody type is incorrect. This is a young, fit man, and there is no reason to suggest that suddenly he has developed auto-immune haemolytic anaemia. Even if he had, the antibody screen is usually strongly positive.

A	Auto-immune haemolytic anaemia of the cold antibody type

Auto-immune haemolytic anaemia of the cold antibody type is incorrect. This is a young, fit man, and there is no reason to suggest that suddenly he has developed auto-immune haemolytic anaemia. Even if he had, the antibody screen is usually strongly positive.

C	Delayed haemolytic transfusion reaction

Delayed haemolytic transfusion reaction is incorrect. The antibody

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8:43
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A	Auto-immune haemolytic anaemia of the cold antibody type

Auto-immune haemolytic anaemia of the cold antibody type is incorrect. This is a young, fit man, and there is no reason to suggest that suddenly he has developed auto-immune haemolytic anaemia. Even if he had, the antibody screen is usually strongly positive.

C	Delayed haemolytic transfusion reaction

Delayed haemolytic transfusion reaction is incorrect. The antibody screen would usually be expected to be positive, particularly if one attempts to elute an antibody from the surface of the patient's RBCs.

E	Haemolytic transfusion reaction caused by an ABO incompatibility

Haemolytic transfusion reaction caused by an ABO incompatibility is incorrect. Here the antibody screen would certainly be positive.

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A 75-year-old man presents with fatigue and weight loss. He has also been noted to be increasingly vague. On examination, he is clinically anaemic and his Mini-Mental score is 5/10. He has 2 cm of splenomegaly and 2 cm of hepatomegaly. There are no other positive findings. Investigation shows the following:

Hb	8.3 g/dl(13-18)
MCV	102fl (80-96)
WCC	6.5 x 10^9/l (4-11 x 10^9) with a normal differential
Platelets	150 x 10^9/l (150-400 x 10^9)
Urea	10 mmol/l (2.5-7.5)
Na^+	139 mmol/l (137-144)
K^+	4.6 mmol/ (3.5-4.9)
Creatinine	135 µmol/l (60-110)
Total protein	88 g/l (61-76)
Alb	24g/l (37-49)
Ca	2.29 (2.2-2.6)
Viscosity	8.2 centipoise (1.5-1.72)
IgG	7.0 g/l (7.0-14.5)
IgA	0.55 g/l (0.80-4.0)
IgM	22.7 g/l (0.45-2.00)

Which one of the following is the most appropriate treatment to improve his clinical state?

A Immediate chemotherapy

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Urea	10 mmol/l (2.5-7.5)
Na^+	139 mmol/l (137-144)
K^+	4.6 mmol/ (3.5-4.9)
Creatinine	135 µmol/l (60-110)
Total protein	88 g/l (61-76)
Alb	24g/l (37-49)
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IgA	0.55 g/l (0.80-4.0)
IgM	22.7 g/l (0.45-2.00)

Which one of the following is the most appropriate treatment to improve his clinical state?

A	Immediate chemotherapy
B	Intravenous fluids
C	Prednisolone
D	Transfusion of packed cells
E	Urgent plasmapheresis

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C	Prednisolone
D	Transfusion of packed cells
E	Urgent plasmapheresis

Explanation

E	Urgent plasmapheresis

This man has hepatosplenomegaly. He is also anaemic with a border-line platelet count. His plasma viscosity is significantly raised, with a raised IgM level. This would all suggest Waldenström's macroglobulinaemia. This is a low-grade lymphoma that is associated with a monoclonal IgM paraprotein. Therefore, urgent plasmapheresis is the correct answer. The paraprotein has led to hyperviscosity, which can cause visual symptoms and retinal changes, as well as impairment of consciousness. It should be noted, however, that it is unlikely that an IgM level of only 22.7 g/l would cause such a significantly raised plasma viscosity. Normally, such a significantly raised plasma viscosity would not be expected until the IgM level was greater than 50 or 60 g/l. With regards to treatment, however, the quickest way of reducing the plasma viscosity is with urgent plasmapheresis.

A	Immediate chemotherapy

Immediate chemotherapy is incorrect. Immediate chemotherapy could certainly be considered, and is often used alongside emergency plasmapheresis. It should be noted that plasmapheresis is usually just a short-term measure and that, without institution of definitive treatment for the underlying lymphoproliferative disorder, the plasma viscosity will simply rise once again, shortly after the plasmapheresis.

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8:44

could certainly be considered, and is often used alongside emergency plasmapheresis. It should be noted that plasmapheresis is usually just a short-term measure and that, without institution of definitive treatment for the underlying lymphoproliferative disorder, the plasma viscosity will simply rise once again, shortly after the plasmapheresis.

B	Intravenous fluids

Intravenous fluids is incorrect. Intravenous fluids are used as a treatment adjunct, but in this situation, urgent plasmapheresis is clearly the most appropriate treatment to improve his clinical state.

C	Prednisolone

Prednisolone is incorrect. Steroids in the form of prednisolone is false. The most appropriate treatment to improve his clinical state is the one that will act the quickest to reduce his plasma viscosity, which is plasmapheresis.

D	Transfusion of packed cells

Transfusion of packed cells is incorrect. Transfusion of packed cells is false and is absolutely contra-indicated. This will in fact make viscosity even higher and could be very detrimental.

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8:44

A 54-year-old female is receiving cytotoxic chemotherapy treatment. After several months of treatment she develops shortness of breath on exertion, and is found to have a degree of left ventricular impairment.

Which of the following cytotoxic agents is she most likely to be receiving, which has caused her cardiomyopathy as a dose-dependent side effect?

A	Bleomycin
B	Cytarabine
C	Doxorubicin
D	Methotrexate
E	Paclitaxel

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A 54-year-old female is receiving cytotoxic chemotherapy treatment. After several months of treatment she develops shortness of breath on exertion, and is found to have a degree of left ventricular impairment.

Which of the following cytotoxic agents is she most likely to be receiving, which has caused her cardiomyopathy as a dose-dependent side effect?

Your answer was correct

A	Bleomycin
B	Cytarabine
C	Doxorubicin
D	Methotrexate
E	Paclitaxel

Explanation

C	Doxorubicin

Doxorubicin is a member of the anthracycline group of cytotoxic agents. The antitumour activity of doxorubicin partly results from the triggering of topoisomerase II-dependent DNA breaks. Doxorubicin can cause acute cardiac toxicity, including a syndrome characterised by arrhythmias and congestive heart failure. More commonly doxorubicin causes a cumulative, dose-dependent decline in left ventricular ejection fraction, with a higher incidence of myocardial dysfunction seen in patients receiving a cumulative dose of [illegible]han 500 mg/m^2.

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A Bleomycin

Bleomycin is incorrect. Bleomycin causes lung toxicity, including pneumonitis, which can progress to interstitial fibrosis.

B Cytarabine

Cytarabine is incorrect. Cytarabine administered in high single doses (3 g/m^2 or greater) can cause irreversible cerebellar dysfunction; therefore, a neurological examination should be performed daily on patients receiving therapy so that it can be discontinued at the earliest sign of such toxicity.

D Methotrexate

Methotrexate is incorrect. Methotrexate in high doses can cause acute renal failure due to drug precipitation in the renal tubules.

E Paclitaxel

Paclitaxel is incorrect. The administration of paclitaxel can cause anaphylaxis in response to Cremophor®, the vehicle in which it is delivered, hence, premedication with dexamethasone and antihistamines is required to reduce the risk of adverse reactions.

8:45
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A 26-year-old teacher presents to the Emergency Department with a rash on her lower legs and a blood blister on her tongue. Her last menses, 2 weeks ago, was heavier than usual. Otherwise she is very well and has no past medical history of note. On examination, there are several small blood blisters on her tongue and a fine petechial rash on her lower legs. There are no other abnormal clinical findings.

Her Hb is 12.8 g/dl, with normal indices, WCC 8.6 × 10^9/litre, with a normal differential and platelets 12 × 10^9/litre.

Which one of the following is likely to be the most appropriate first-line therapy in this patient?

A	Intravenous immunoglobulin
B	Oral prednisolone: 1–2 mg/kg (50–100 mg daily dose)
C	Immediate platelet transfusion
D	Transfusion of fresh-frozen plasma
E	All of the above

1796

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Previous Question Skip Question

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8:46
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Explanation

B	Oral prednisolone: 1–2 mg/kg (50–100 mg daily dose)

This lady once again has an isolated thrombocytopenia. There is nothing in the history to suggest a drug-induced thrombocytopenia. One would assume that therefore this represents immune thrombocytopenia. First-line treatment for immune thrombocytopenia is oral steroids at this dose.

A	Intravenous immunoglobulin

Intravenous immunoglobulin is usually reserved as first-line therapy in patients who have very significant bleeding at presentation, such as widespread mucosal bleeding in the mouth or gastrointestinal blood loss. This is not the case for this woman.

C	Immediate platelet transfusion

Platelet transfusions are only reserved for life-threatening bleeding in ITP. Platelets will be rapidly destroyed by the immune process.

D	Transfusion of fresh-frozen plasma

Transfusion of fresh frozen plasma is incorrect, as it clearly will not have any impact on the immune process, or on the low platelet count.

E	All of the above

All of the above is incorrect. This patient is likely to have an immune thrombocytopenia for which the treatment is oral Prednisolone. Platelet transfusion and IV immunoglobulin are indicated in cases with severe bleeding. Fresh frozen plasma would be of no benefit in an immu diated thrombocytopenia.

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A 54-year-old man presents with a 2-month history of increasing lethargy. He also reports that he has been bruising more easily of late. On direct questioning he admits to passing dark urine, but denies any other urinary symptoms. A year ago he had finished a 6-month period of anticoagulant therapy for a spontaneous deep vein thrombosis. His full blood count demonstrates haemoglobin 6.5 g/dl, white blood-cell count 2.8×10^9/l, and platelets 27×10^9/l.

What is the most appropriate management for his anaemia?

A	Androgen 'hormonal' therapy
B	Erythropoietin injections
C	Folic acid therapy
D	Transfusion with blood substitutes
E	Transfusion with red cells

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Previous Question | Skip Question

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Explanation

E Transfusion with red cells

Transfusion with red cells is the best way to manage this man's anaemia. Essentially, this man is pancytopenic. He has a background history of a deep vein thrombosis, and this combination should suggest a diagnosis of paroxysmal nocturnal haemoglobinuria (PNH). This can also be associated with aplastic anaemia, and a bone marrow examination should certainly be performed to diagnose this. There is historical literature to suggest that washed red cells was a superior transfusion product for PNH patients. However, there is no evidence that survival of washed red cells is better than that of standard red cells.

D Transfusion with blood substitutes

Transfusion with blood substitutes is incorrect. Transfusion with blood substitutes is certainly not a correct answer, as these are not routinely available.

A Androgen 'hormonal' therapy

Androgen 'hormonal' therapy is incorrect. Androgen hormonal therapy again can be regarded as an adjunctive therapy, but would not replace red cell transfusion.

B Erythropoietin injections

Erythropoietin injections is incorrect. It would be expected that this man's erythropoietin levels will naturally be high as a result of the anaemia, and therefore additional erythropoietin supplementation will not be beneficial.

[redacted] d therapy

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Folic acid therapy is incorrect. Folic acid therapy is an important

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8:51
On
738-627-5670
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Question 40 of 100

blood substitutes is certainly not a correct answer, as these are not routinely available.

A	Androgen 'hormonal' therapy

Androgen 'hormonal' therapy is incorrect. Androgen hormonal therapy again can be regarded as an adjunctive therapy, but would not replace red cell transfusion.

B	Erythropoietin injections

Erythropoietin injections is incorrect. It would be expected that this man's erythropoietin levels will naturally be high as a result of the anaemia, and therefore additional erythropoietin supplementation will not be beneficial.

C	Folic acid therapy

Folic acid therapy is incorrect. Folic acid therapy is an important adjunct for all patients who are haemolysing, but cannot be regarded as more appropriate than standard transfusion with red cells.

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Previous Question
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Feedback
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Which antigen is involved in the entry of *Plasmodium vivax* into red cells?

A	Anti-D
B	Anti-S
C	Duffy
D	Kell
E	Kidd

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Previous Question Skip Question

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Which antigen is involved in the entry of *Plasmodium vivax* into red cells?

Your answer was correct

A	Anti-D
B	Anti-S
C	Duffy
D	Kell
E	Kidd

Explanation

C	Duffy

People of West African origin are strikingly resistant to Plasmodium vivax infection. This correlates with the extreme rarity of the Duffy blood-group antigen alleles FYA and FYB encoding Fya and Fyb, which are receptors for penetration of the red cell by the merozoites.

A	Anti-D

Anti-D is incorrect. This antigen is not involved in *Plasmodium vivax* infection.

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What is the most likely sequela of anaplastic thyroid carcinoma?

A	Brain metastasis
B	Good prognosis
C	Hypercalcaemia
D	Liver metastasis
E	Upper airway obstruction

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Calculator

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Explanation

E	Upper airway obstruction

Anaplastic carcinoma is the rarest of all thyroid tumours (<1%). Cervical lymph node metastases are present in 90% at diagnosis, lung metastases in 50% and tracheal invasion in 25%. Anaplastic carcinoma has a very poor prognosis with a median survival of 4–5 months.

The most common sequela is upper airway obstruction. Surgery has a limited role in relieving obstructive symptoms; external beam radiotherapy is useful in palliation. The role of chemotherapy (usually doxorubicin combined with other drugs) is unclear. Many patients will require a tracheostomy to manage airway obstruction.

Brain and liver metastases may occur but are not common. Bone, lung and cervical lymph node metastases are common. Hypercalcaemia is not a feature of anaplastic thyroid cancer unless secondary to bone metastases. In medullary thyroid cancer, calcium metabolism can be disordered owing to elevated levels of calcitonin secreted by the tumour.

A	Brain metastasis

Brain metastasis is incorrect. Brain metastases may occur but they are not common.

B	Good prognosis

Good prognosis is incorrect. Anaplastic carcinoma has a very poor prognosis with a median survival of 4–5 months.

C	Hypercalcaemia

Hypercalcaemia is incorrect. Hypercalcaemia is not a feature of anaplastic thyroid cancer unless secondary to bone metastases.

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D	Liver metastasis

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A 47-year-old alcoholic was brought into the Emergency Department unconscious. He had multiple bruises over his trunk and had suffered a nosebleed from which he was still oozing. His spleen was palpably enlarged.

Which vitamin deficiency is most likely to have contributed to his bleeding?

A	Vitamin A
B	Vitamin B
C	Vitamin C
D	Vitamin D
E	Vitamin K

45147

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Previous Question Skip Question

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8:52
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Explanation

E	Vitamin K

Vitamin K is required for the post-translation modification of factors II, VII, IX and X. The other vitamins listed will not play a significant role in blood coagulation, and therefore vitamin K is the correct answer.

A	Vitamin A

Vitamin A is incorrect. Vitamin A does not play a significant role in blood coagulation.

B	Vitamin B

Vitamin B is incorrect. Vitamin B does not play a significant role in blood coagulation.

C	Vitamin C

Vitamin C is incorrect. Vitamin C does not play a significant role in blood coagulation.

D	Vitamin D

Vitamin D is incorrect. Vitamin D does not play a significant role in blood coagulation.

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8:53
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A 22-year-old woman of White ethnicity presents to the GP complaining of an acutely swollen, painful, left arm. She has an unremarkable past medical history and takes the contraceptive pill as her only medication. On examination, her arm looks swollen and oedematous, with some evidence of venous distension.

Investigations:

Hb	131 g/l
WCC	4.5 x 10^9/l
PLT	200 x 10^9/l
Na^+	139 mmol/l
K^+	4.5 mmol/l
Creatinine	120 µmol/l
APTT and PT normal	
Left arm venogram: extensive axillary vein thrombosis	

You suspect an inherited prothrombotic disorder.

Which is the most common inherited prothrombotic disorder in patients of northern European origin?

A	Antithrombin III deficiency
B	Heterozygous factor V Leiden
C	C deficiency

Annotation
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Video
Share
Participants
More

E Prothrombin mutation

Explanation

B Heterozygous factor V Leiden

Heterozygous factor V Leiden is the most common inherited prothrombotic disorder in patients of northern European origin. This is present in between 5 and 15% of the population.

A Antithrombin III deficiency

Antithrombin III deficiency is incorrect. Antithrombin deficiency is much less common. Type I antithrombin gene mutations are present in the general population on the order of 0.02%.

C Protein C deficiency

Protein C deficiency is incorrect. Protein C deficiency is present in the population at a rate of approximately 0.2–0.3%.

D Protein S deficiency

Protein S deficiency is incorrect. Protein S deficiency is present in the general population at a rate of around 1–2%.

E Prothrombin mutation

Prothrombin mutation is incorrect. Prothrombin gene mutations are present in approximately 2% of the healthy population from northern Europe.

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Question 45 of 100

A patient with chronic lymphocytic leukaemia underwent splenectomy because he did not respond to immunosuppression and chemotherapy.

Which one of the following is the most likely long-term risk after splenectomy?

A	Anaemia
B	Cancer
C	Infections
D	Liver fibrosis
E	Lymphoma

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Previous Question | Skip Question

Calculator

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D Liver fibrosis

Liver fibrosis is incorrect. Liver fibrosis is not the most likely long-term risk following splenectomy.

E Lymphoma

Lymphoma is incorrect. Lymphoma is not a long-term risk following splenectomy.

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A 55-year-old male presents with palpable lymphadenopathy in the left supraclavicular fossa (Troisier's sign).

Which primary tumour site is typically associated with this clinical sign?

A	Kidney
B	Lung
C	Prostate
D	Stomach
E	Uterus

45543

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Previous Question | Skip Question

Calculator

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D	Stomach

Most frequently, palpable lymphadenopathy (Virchow's node) in the left supraclavicular fossa (Troisier's sign) indicates carcinoma of the stomach. Other features of gastric carcinoma may include a palpable epigastric mass (in up to 30% of patients) suggesting advanced disease, dermatomyositis or acanthosis nigricans. Metastases occur to the peritoneum (with ascites and possibly ovarian involvement – Krukenberg's tumour), liver, lung and other sites. Gross haematemesis from gastric cancers may occur but is unusual. The most common presentation is with non-specific systemic symptoms such as fatigue, weight loss and anaemia.

A	Kidney

Kidney is incorrect. Kidney cancer spreads to para-aortic, renal hilar and caval lymph nodes.

B	Lung

Lung is incorrect. Lung cancer typically metastasises to mediastinal and cervical lymph nodes, and can also affect the supraclavicular fossa on either side.

C	Prostate

Prostate is incorrect. Prostate cancer spreads to pelvic and para-aortic lymph nodes.

E	Uterus

Uterus is incorrect. Uterine cancer typically spreads to the pelvic nodes and intra-abdominal viscera.

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A 67-year-old man who was diagnosed with chronic lymphocytic leukaemia (CLL) some 4 years earlier comes to the Haematology Clinic for review. He has so far been symptom-free and has not yet required intervention, although he has begun to feel tired over the past 2–3 months. His BP is 132/72 mmHg, pulse is 75/min and regular. He looks pale. There is moderate splenomegaly and evidence of lymphadenopathy, but nothing else of note.

Investigations:

Hb	8.9 g/dl
MCV	74 fl
WCC	24.2 x 10^9/l (lymphocytosis), previously 22.1 x 10^9/l
PLT	167 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	110 micromol/l
Urea	6.8 mmol/l
ALT	62 U/l
ALP	89 U/l
Bilirubin	14 micromol/l

Which of the following is the most likely cause of his anaemia?

A	Acute leukaemic transformation
B	GI blood loss
C	Lymphomatous transformation

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required intervention, although he has begun to feel tired over the past 2-3 months. His BP is 132/72 mmHg, pulse is 75/min and regular. He looks pale. There is moderate splenomegaly and evidence of lymphadenopathy, but nothing else of note.

Investigations:

Hb	8.9 g/dl
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ALP	89 U/l
Bilirubin	14 micromol/l

Which of the following is the most likely cause of his anaemia?

A	Acute leukaemic transformation
B	GI blood loss
C	Lymphomatous transformation
D	Marrow infiltration
E	Myelofibrosis

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Explanation

B	GI blood loss

GI blood loss is the most likely answer here. The anaemia is a microcytic picture, implyingiron deficiency. We know that this man's CLL is stable, with a stable white cell count. Anassessment of serum ferritin, with subsequent endoscopy would be indicated.

A	Acute leukaemic transformation

Acute leukaemic transformation is incorrect. This man's platelet count is normal, and there is noevidence in the question of any immature myeloid blasts on the blood film which mightsuggest acute leukaemia. Furthermore, transformation of CLL to acute leukaemia would bevery rare in a gentleman who has not required any treatment for his CLL thus far.

C	Lymphomatous transformation

Lymphomatous transformation is incorrect. There is no evidence of particularly rapidly enlarging lymph nodes,no evidence of hypercalcaemia or significant new weight loss. This makes the possibility of lymphomatous transformation, also known as Richter's transformation, less likely.

D	Marrow infiltration

Marrow infiltration is incorrect. Marrow infiltration by CLL is less likely. The platelet count is normal, and we know that this man's white cell count, along with his lymphocyte, remains stable. This would not therefore indicate progressive marrow infiltration.

E	Myelofibrosis

Myelofibrosis is incorrect. Myelofibrosis is not connected to CLL. Once again, the absence of immature white cells inthe peripheral

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A patient presents with pancytopenia (anaemia, leukopenia, thrombocytopenia). No material could be obtained from a bone marrow aspiration.

Which is the next investigation employed to obtain a diagnosis?

A	Level of LDH in serum
B	Chromosome analysis
C	Bone marrow biopsy and histological examination
D	Level of alkaline phosphatase in serum
E	Level of vitamin B12 in serum

41774

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Previous Question Skip Question

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Explanation

C	Bone marrow biopsy and histological examination

Bone marrow biopsy and a histological examination is the next investigation to obtain a diagnosis in this case. There is a pancytopenia which suggests an underlying marrow problem and failure of production of all types of blood cells. When a bone marrow aspirate cannot be obtained, it is termed a dry tap. One therefore then needs a bone marrow trephine, which is a core of solid bone marrow that can then be looked at histologically.

A	Level of LDH in serum

An LDH level in serum is false as it will not give the underlying diagnosis.

B	Chromosome analysis

Chromosome analysis is false as it will not give the underlying diagnosis.

D	Level of alkaline phosphatase in serum

Level of alkaline phosphatase in the serum is too non-specific and will not give a specific diagnosis.

E	Level of vitamin B12 in serum

Level of B12 in the serum will not point towards a specific diagnosis. The differential here is very broad, but can include metastatic carcinoma, aplastic anaemia, acute leukaemia or marrow involvement with lymphoma.

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Which one of the following features is characteristic of immune thrombocytopenic purpura (ITP)?

A	Infants born to a woman with ITP often present with bleeding diathesis in the first 48 h
B	Pancytopenia is a recognised complication
C	Leukaemic transformation occurs late in the disease
D	Splenomegaly is found in 50% of cases
E	Autoimmune haemolytic anaemia is a recognised association

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association

When ITP co-exists with an autoimmune haemolytic anaemia, it is known as Evans syndrome. The management of this condition is usually the same, namely with immunosuppression using steroids as a firstline treatment.

A Infants born to a woman with ITP often present with bleeding diathesis in the first 48 h

Infants born to a woman with ITP often present with bleeding problems in the first 48 h is incorrect. Although the infant's platelet count may decrease after birth, this is rarely severe enough to induce significant bleeding in the new-born infant.

B Pancytopenia is a recognised complication

Pancytopenia is not a recognised complication of ITP.

C Leukaemic transformation occurs late in the disease

Leukaemic transformation occurs late in the disease is incorrect. There is no evidence of increased leukaemic transformation in ITP.

D Splenomegaly is found in 50% of cases

Splenomegaly is found in 50% of cases is incorrect. Although the site of destruction of the platelets is in the spleen, it is rare to get significant splenomegaly and certainly not in 50% of cases.

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A 52-year-old man with idiopathic thrombocytopaenic purpura is admitted to the High Dependency Unit a few days after receiving a platelet transfusion. On examination he is pyrexial 38.2 °C, has a BP of 95/60 mmHg, and a pulse of 100 bpm.

Which one of the following is the most common pathogen transmitted via platelet transfusion?

A	Hepatitis B
B	HIV
C	Malaria
D	*Staphylococcus*
E	Treponema

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Previous Question | Skip Question

Calculator

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C	Malaria
D	*Staphylococcus*
E	Treponema

Explanation

D	*Staphylococcus*

Staphylococcus is the most common pathogen transmitted via platelet transfusion. This is skin derived from the platelet donor. Platelets are particularly vulnerable to bacterial contamination because they are stored at room temperature for up to 5 days, whereas red cells are refrigerated and fresh-frozen plasma is frozen.

A	Hepatitis B

Hepatitis B is incorrect. All donor blood is now screened for hepatitis B, making this much less likely.

B	HIV

HIV is incorrect. All donor blood is now screened for HIV, making this much less likely.

C	Malaria

Malaria is incorrect. Patients have to answer a questionnaire before they donate blood. Patients are not permitted to donate blood until 6 months after return from a malarial area.

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A patient with chronic lymphocytic leukaemia (CLL) on combination chemotherapy still has haemolytic anaemia and thrombocytopenia despite fludarabine. His Hb has dropped by 3 g over the past 3 months despite a course of corticosteroids.

Which one of the following interventions will most likely be of benefit?

A	Bone marrow transplantation
B	Erythropoietin
C	High-dose dexamethasone
D	Iron infusions
E	Splenectomy

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Previous Question | Skip Question

Calculator

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E Splenectomy

This is a difficult question. Essentially, this man has CLL and he also has auto-immune phenomenon despite fludarabine. Nowadays, single agent fludarabine as a treatment would be uncommon for patients with CLL. It sounds like the patient has ongoing auto-immune haemolytic anaemia despite corticosteroids. In this situation, the anti-CD20 antibody rituximab may be very helpful. Splenectomy is not without risks, and usually patients with CLL are elderly. It remains, however, an effective treatment for auto-immune haemolytic anaemia that has not responded to steroids.

C High-dose dexamethasone

High-dose dexamethasone is incorrect. If someone has not responded to high-dose steroids in the form of prednisolone at a dose of 1 mg/kg, they are unlikely to respond to high-dose dexamethasone.

A Bone marrow transplantation

Bone marrow transplantation is incorrect. Bone marrow transplantation is not without risks, and the indications for transplantation in CLL are very few, usually because this is a disease of the elderly, and most patients cannot undergo the procedure because of their advanced age.

B Erythropoietin

Erythropoietin is incorrect. It sounds as if this patient has ongoing auto-immune haemolytic anaemia despite corticosteroids. One would imagine that the patient's own erythropoietin levels will be high in response to the anaemic challenge.

D Iron infusions

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Iron infusions is incorrect. There is no suggestion in the question

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A 22-year-old White patient presents to the clinic with jaundice and pallor. He has recently suffered an upper respiratory tract infection. He tells you that his father had a splenectomy.

On examination his temperature is 37.5 °C, his BP is 122/75 mmHg. He looks pale and has jaundiced sclerae. He has splenomegaly on abdominal examination.

Investigations:

Hb	99 g/l (uniform spherocytes seen on blood film)
WCC	5.6 x 10^9/l
PLT	130 x 10^9/l
Na^+	140 mmol/l
K^+	4.2 mmol/l
Creatinine	130 µmol/l
Bilibrubin	203 µmol/l

Which one of the following is the best way to confirm the diagnosis?

A	Cold agglutinins
B	Coombs' test
C	Haemoglobin electrophoresis
D	No further tests
E	fragility test

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Explanation

D	No further tests

This man has enough clinical and laboratory features to indicate that he has hereditary spherocytosis. The question tells us that his father has had a splenectomy, and more information should be gathered about why this was the case. He now has evidence of haemolysis, with spherocytes on the blood film with a raised bilirubin level. This is entirely sufficient to make a diagnosis of hereditary spherocytosis.

B	Coombs' test

Coombs' test is incorrect. Coombs' test would be a useful additional test to show that there is no autoimmune component to the hereditary spherocytosis.

A	Cold agglutinins

Cold agglutinins is incorrect. Cold agglutinins are immunoglobulins which bind to red blood cells in the cold. These are often associated with underlying lymphoproliferative disorders, but the family history, clinical presentation and laboratory features are entirely consistent with hereditary spherocytosis.

C	Haemoglobin electrophoresis

Haemoglobin electrophoresis is incorrect. This is a White patient, so therefore the possibility of a haemoglobinopathy would be low.

E	Osmotic fragility test

Osmotic fragility test is incorrect. Osmotic fragility tests can be used to the diagnosis in very difficult cases, but this is a time consuming test with many technical difficulties, so it is rarely done nowadays. Patients with a family history of hereditary

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A 28-year-old woman presents to the clinic. She is 3 months' pregnant and has a history of beta thalassaemia trait.

Which of the following haemoglobin variants found elevated in the husband would be associated with a significant risk of thalassaemia major in the offspring?

A	HbA
B	HbC
C	HbF
D	HbI
E	HbM

47232

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Previous Question | Skip Question

Calculator

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C HbF

Elevated levels might suggest the possibility of beta thalassaemia trait in the husband. If a couple both have beta thalassaemia trait,there is a one in four chance that the offspring may have beta thalassaemia major.

A HbA

HbA is incorrect. Haemoglobin A is false, as this is the most common form of haemoglobin found in healthyindividuals, making up over 95% of normal haemoglobin.

B HbC

HbC is incorrect. Haemoglobin C occurs due to a variant in the beta globin gene, leading to a mild chronic haemolytic anaemia. Offspring of a couple where one has thalassaemiatrait and the other has elevated haemoglobin C may be prone to worse episodes of haemolytic anaemia. However, this will not be as severe as thalassaemia major.

D HbI

HbI is incorrect. Haemoglobin I is a variant identified in Sardinian sheep!

E HbM

HbM is incorrect. Haemoglobin M is the term given to a variety of alpha, beta and gamma chain haemoglobin variants that show an increased tendency to oxidation to methaemoglobin with consequent cyanosis.

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A 32-year-old man presents to the Emergency Department with uncontrolled bleeding from his gums. He received etoposide-based chemotherapy some 2 years ago and has been well in the intervening period. Over the past few weeks he has noticed increasingly easy bruising, pinpoint haemorrhages on his skin, and bleeding when he cleans his teeth. The blood picture is consistent with a diagnosis of acute promyelocytic leukaemia (APML).

Which of the following is the most appropriate initial treatment regimen?

A	All trans retinoic acid (ATRA), plus anthracycline based chemotherapy
B	All trans retinoic acid (ATRA) plus cytarabine
C	Cytarabine and anthracycline
D	Cytarabine then progress to stem cell transplantation
E	Stem cell transplantation

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Previous Question | Skip Question

Calculator

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A	All trans retinoic acid (ATRA), plus anthracycline based chemotherapy

ATRA plus anthracycline-based chemotherapy is the most appropriate initial treatment. This is standard treatment for patients with acute promyelocytic leukaemia.

B	All trans retinoic acid (ATRA) plus cytarabine

All-trans-retinoic acid (ATRA) plus cytarabine is incorrect. The backbone of treatment of APML is ATRA plus an anthracycline.

C	Cytarabine and anthracycline

Cytarabine and anthracycline is incorrect. Cytarabine and anthracycline is typically given to patients with non-APML forms of acute myeloid leukaemia, but ATRA has to be incorporated into all initial treatments for APML.

D	Cytarabine then progress to stem cell transplantation

Cytarabine then progress to stem cell transplantation is incorrect. All initial treatment for APML must incorporate ATRA. Stem cell transplantation is usually not required in patients with APML, given its good prognosis.

E	Stem cell transplantation

Stem cell transplantation is incorrect. Stem cell transplantation is always preceded by some form of chemotherapy in haematological malignancies, and as discussed in answer D, this is not required in APML, given the excellent survival rates with chemotherapy alone.

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You review a 76-year-old man who complains of symptoms of indigestion. Endoscopy reveals a lesion suspicious of oesophageal carcinoma.

Which statement about oesophageal cancer occurring in Western Europe/USA is true?

A	Adenocarcinoma is the rarest type of oesophageal cancer in the USA
B	Barrett's oesophagus is associated with squamous carcinoma
C	Dysphagia is an early manifestation
D	Most oesophageal cancers are not resectable at presentation
E	Oesophageal cancer is most commonly located in the proximal third of the oesophagus

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Previous Question | Skip Question

Calculator

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D	Most oesophageal cancers are not resectable at presentation

Most oesophageal cancers are associated with mild symptoms until very late in the time course of the disease and at the time of diagnosis most are unresectable. Dysphagia is a late symptom. Most patients present with stage 3 disease (late stage) and survival at 5 years is only 9%. In the rare group of patients with stage 1 disease (surgically resectable), survival approaches 80% at 5 years.

Oesophageal cancer is only rarely found in the proximal third of the oesophagus. Forty per cent of oesophageal carcinomas occur in the middle third of the oesophagus and are usually squamous-cell carcinomas. Forty-five per cent of cases occur in the lower third and are usually adenocarcinomas.

C	Dysphagia is an early manifestation

Dysphagia is an early manifestation is incorrect. Dysphagia is a late symptom of oesophageal cancer.

A	Adenocarcinoma is the rarest type of oesophageal cancer in the USA

Adenocarcinoma is the rarest type of oesophageal cancer in the USA is incorrect. The incidence of adenocarcinoma has progressively increased over the past 20 years, representing >50% of all oesophageal cancers (US data).

B	Barrett's oesophagus is associated with squamous carcinoma

Barrett's oesophagus is associated with squamous carcinoma is incorrect. Barrett's oesophagus is associated with the development of adenocarcinoma.

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E Oesophageal cancer is most commonly located in the

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A 40-year-old woman is worried about her risk of bowel cancer. Her father and two of her brothers all died from colorectal cancer in their 40s and 50s.

Which other cancer would you specifically ask about in female relatives?

A	Breast cancer
B	Cervical cancer
C	Endometrial cancer
D	Lung cancer
E	Vulval cancer

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Previous Question | Skip Question

Calculator

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D	Lung cancer
E	Vulval cancer

Explanation

C	Endometrial cancer

The family history is suggestive of a hereditary predisposition to bowel cancer, most probably hereditary, non-polyposis colorectal cancer (HNPCC). Approximately 70% of families with HNPCC have mutations in one of six known genes. The lifetime risk of developing colorectal cancer in affected individuals with HNPCC is 70–80% for men and 40–65% for women, with a mean age of onset of colorectal cancer at 44 years compared with 62 years in the general population. Affected females in HNPCC kindred have a 40–60% lifetime risk of developing endometrial cancer, so a history of endometrial cancers would further increase the likelihood that this is an HNPCC family. The risks for cancers of the small intestine, ureter, stomach, ovary and kidney can also be increased in HNPCC. Identifying such families is important as genetic testing is available and gene testing can be used to identify at-risk individuals who would benefit from colonoscopic screening.

A	Breast cancer

Breast cancer is incorrect. Hereditary breast cancer can be associated with a mutation in the BRCA genes, which can also cause ovarian, fallopian tube, prostate and pancreatic cancers.

B	Cervical cancer

Cervical cancer is incorrect. Cervical cancer is not commonly associated with hereditary syndromes.

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A 39-year-old, previously well, woman is referred to you with a 3-month history of asthma and wheezing with occasional episodes of haemoptysis. She also tells you that she might be perimenopausal as she has had severe episodes of flushing. You suspect there might be an underlying pathological process.

Which one of the following investigations is most likely to reveal a cause?

A	Urine 5-hydroxyindolacetic acid
B	Urine calcium
C	Urine catecholamines
D	Urine cortisol
E	Urine vanillylmandelic acid

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Previous Question | Skip Question

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Explanation

A	Urine 5-hydroxyindolacetic acid

Levels of 5-hydroxyindoleacetic acid (5-HIAA), a breakdown product of serotonin metabolism, are raised in carcinoid syndrome. This syndrome is characterised by tachycardia, flushing, bronchoconstriction, haemodynamic instability and diarrhoea, and occurs in up to 10% of patients with bronchial carcinoid tumours.Some 25% of patients with a carcinoid pulmonary tumour are asymptomatic; however, the majority of symptomatic patients have symptoms directly involving the bronchopulmonary tree, such as persistent atelectasis, recurrent pneumonia, pulmonary abscess and bronchiectasis.

Carcinoid syndrome occurs in up to 10% of cases of pulmonary carcinoid tumours, much less frequently than in cases associated with gastrointestinal carcinoid tumours. Bronchopulmonary carcinoid tumours are reported to represent about 10% of all carcinoid tumours and 1–5% of all lung tumours are carcinoid tumours..

B	Urine calcium

Urine calcium is incorrect. Urine calcium levels will be increased if there is hypercalcaemia, for example as a complication of squamous-cell carcinoma of the lung; this would be associated with abdominal pains, constipation, nausea and vomiting.

C	Urine catecholamines

Urine catecholamines is incorrect. Urine catecholamines are increased in phaeochromocytomas, which would be associated with hypertension, tachycardia and headaches.

D	Urine cortisol

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Urine cortisol is incorrect. Increased urine levels of cortisol may

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The headmaster of the local school had recently been diagnosed as having prostatic carcinoma. Lately he had suffered bone pain, was anaemic and had striking changes on the blood film.

Which one of the following is the most likely blood-film abnormality?

A	Anaemia on blood film
B	Leukaemoid reaction on blood film
C	Leukoerythroblastic blood film
D	Microangiopathic blood film
E	Thrombocyopenia on blood film

4514

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Previous Question Skip Question

Calculator

Normal Values

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Explanation

C	Leukoerythroblastic blood film

Leucoerythroblastic blood film is the most likely blood film abnormality. We are told that this man has bone pain in the setting of prostatic carcinoma, so this suggests that metastatic disease has spread to the bone. We are told that this man is anaemic, and has striking changes on the blood film. This is therefore most likely of bone marrow spread by the prostate cancer, which will result in a leucoerythroblastic blood picture. This is characterised by the presence of immature white and red blood cells on the peripheral blood film.

A	Anaemia on blood film

Anaemia on blood film is incorrect. Anaemia on the blood film is difficult to spot. Anaemia is not a change that can be described on a blood film accurately.

B	Leukaemoid reaction on blood film

Leukaemoid reaction on blood film is incorrect. Patients with malignant disease can have a high white cell count as a result of what is known as a leukaemoid reaction. However, this would not necessarily fit in with the fact that he has bone pain, and the fact that he is anaemic.

D	Microangiopathic blood film

Microangiopathic blood film is incorrect. Microangiopathic blood film can be found in thrombotic thrombocytopenic purpura (TTP). This can be an association with malignant disease. We are not told that this man has a low platelet count or any symptoms of thrombocytopenia. We are told, however, that this man has bone pain, which suggests metastatic bony disease, and therefore bone marrow spread resulting in a leucoerythroblastic blood picture would be much more likely.

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A 48-year-old woman comes to the clinic for review. She has not had a period for some 5 months and has been suffering from depressed mood, decreased sex drive and sweats at night. She has read about the benefits of HRT when used in the peri-menopausal period and wants to discuss options for HRT with you.

Which of the following fits best with the risks of HRT?

A	The risk of colorectal cancer is doubled
B	The risk of ovarian cancer is doubled
C	There is at least a doubling of risk of DVT.
D	There is at least a doubling of the risk of stroke
E	There is one extra case of breast cancer per 100 women per annum who take HRT

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Previous Question | Skip Question

Calculator

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7:35
On
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Question 10 of 50
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Explanation

C There is at least a doubling of risk of DVT.

Patients taking HRT are at 2-3 times the risk of DVT compared to similar individuals not taking HRT.

A The risk of colorectal cancer is doubled

The risk of colorectal cancer is incorrect. The risk of colorectal cancer may be reduced in patients taking HRT.

B The risk of ovarian cancer is doubled

With regards to ovarian cancer is incorrect. With regards to ovarian cancer there is conflicting evidence with respect to either a small increase or no harm with HRT prescription.

D There is at least a doubling of the risk of stroke

The risk of stroke is incorrect. The risk of stroke appears to be increased in women above the age of 60 who are taking HRT. For women under 60 there does not appear to be an increased risk of stroke.

E There is one extra case of breast cancer per 100 women per annum who take HRT

With regards to breast cancer is incorrect. With regards to breast cancer there is one extra case per 1000 women per annum who take HRT.

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A 45-year-old female attends the accident and emergency department with diarrhoea. She explains she has a tumour but cannot remember the name of it; however, she is certain that it has been described to her as 'serotonin secreting'.

What malignancy is she most likely to be suffering from?

A	Macrocystic pancreatic adenoma
B	Mucinous pancreatic cystadenoma
C	Neuroendocrine tumour of the ileum
D	Paraganglioma
E	Phaeochromocytoma

45547

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Previous Question | Skip Question

Calculator

Normal Values

Annotation Stop Share

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C	Neuroendocrine tumour of the ileum

Neuroendocrine tumours (NETs) are most commonly found in the ileum. Patients with these tumours have 5-year survival rates in excess of 75%, in the absence of liver metastases. Multifocal small-bowel disease is present in approximately 30% of cases. NETs that are more than 2 cm in diameter have frequently metastasised when detected. Carcinoid syndrome due to excessive amounts of serotonin occurs in the presence of liver metastases. Treatment may involve resection of the primary tumour and hepatic metastases, the use of somatostatin analogues (octreotide) to control the effects of hormone excess, and peptide receptor radiotargeted therapy (PRRT).

A	Macrocystic pancreatic adenoma

Macrocystic pancreatic adenoma is incorrect. Macrocystic pancreatic adenomas are rare non-secretory tumours characterised by a multi-lobulated cystic lesion within the pancreas.

B	Mucinous pancreatic cystadenoma

Mucinous pancreatic cystadenoma is incorrect. Mucinous pancreatic cystadenomas are tumours of the mucin-secreting columnar epithelium within the pancreas and are usually solitary and benign.

D	Paraganglioma

Paraganglioma is incorrect. Paraganglioma is a tumour of the sympathetic nervous system originating in variable sites, including carotid body, glomus jugulare and sympathetic paravertebral ganglion of the abdomen, and rarely may secrete catecholamines (approximately 2% of tumours).

E	Phaeochromocytoma

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A 73-year-old man comes to the clinic for a routine check-up involving general physical examination, full blood count, U&E and ESR. He is well, apart from a historyof mild hypertension treated with lisinopril. On examination his BP is 149/82 mmHg, pulse is 80/min and his BMI is 23. One enlarged cervical lymph node (1cm) is noted; there are no other abnormal findings apart from splenomegaly. Investigations:

Hb	129 g/l
WCC	16.3 x 10^9/l
Lymphocytes	11.2 x 10^9/l
PLT	173 x 10^9/l
Na^+	136 mmol/l
K^+	4.3 mmol/l
Creatinine	129 µmol/l
ESR	75 mm/h

Which of the following is the next most appropriate investigation to confirm the cause of this lymphocytosis?

A	Bone marrow aspiration
B	CT abdomen
C	LDH
D	Lymph node biopsy
E	Peripheral blood flow cytometry immunophenotyping

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E	Peripheral blood flow cytometry immunophenotyping

Peripheral blood flow cytometry, also known as immunophenotyping, is the next most appropriate investigation to confirm the cause of his lymphocytosis. Immunophenotyping looks at the expression of proteins on the surface of the lymphocytes. The most likely diagnosis here is early-stage chronic lymphocytic leukaemia (CLL). The lymphocytes in CLL express certain proteins on the surface, which can be characterised by immunophenotyping. The advantage is that this can be done on peripheral blood, which is not invasive, with results readily available in a few hours or days.

A	Bone marrow aspiration

Bone marrow aspiration is incorrect. Bone marrow aspiration is an invasive procedure and this is not required. Investigating cell surface markers in the peripheral blood is much less invasive and certainly is the first-line investigation to confirm the cause of the lymphocytosis. If cell surface markers suggested perhaps an underlying lymphoma, then at that point in time a bone marrow examination may be required, but it is not the first investigation in this patient.

B	CT abdomen

CT abdomen is incorrect. CT scan of the abdomen is not a first-line investigation. Although this may show lymphadenopathy, this will not help to distinguish between CLL and other lymphoproliferative disorders.

C	LDH

LDH is incorrect. LDH elevation is a non-specific finding for haematological malignancies. It is usually normal in CLL, and this investigation again does not distinguish CLL from other lymphoproliferative disorders.

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underlying lymphoma, then at that point in time a bone marrow examination may be required, but it is not the first investigation in this patient.

B	CT abdomen

CT abdomen is incorrect. CT scan of the abdomen is not a first-line investigation. Although this may show lymphadenopathy, this will not help to distinguish between CLL and other lymphoproliferative disorders.

C	LDH

LDH is incorrect. LDH elevation is a non-specific finding for haematological malignancies. It is usually normal in CLL, and this investigation again does not distinguish CLL from other lymphoproliferative disorders.

D	Lymph node biopsy

Lymph node biopsy is incorrect. Lymph node biopsy is an invasive procedure, and a lymph node biopsy is only required if there is evidence of rapidly progressive lymphadenopathy, or other features suggestive of a high-grade lymphoma.

47051

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7:40

A 60-year-old man presents with lethargy, nausea and lower back pain. He has a previous history of hypertension for which he takes ramipril10 mg daily and symptoms of prostatism for which he takes finasteride. On examination his BP is 142/78 mmHg. He has a mild spondylosis and tenderness over his lumbar spine.

Investigations:

Hb	102 g/l
WCC	8.1 x 10^9/l
PLT	132 x 10^9/l
IgA	3.2 g/l
IgG	22.1 g/l (H)
IgM	1.8 g/l
ESR	61 mm/
Na^+	140 mmol/l
K^+	4.9 mmol/l
Creatinine	167 µmol/l
Albumin	25 g/l
Ca^{2+}	2.8 mmol/l
PSA	4.8 µg/l

Which one of the following is the most likely diagnosis?

A Hyperparathyroidism

B onal gammopathy of undetermined significance

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Hb	102 g/l
WCC	8.1 x 10^9/l
PLT	132 x 10^9/l
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Albumin	25 g/l
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PSA	4.8 µg/l

Which one of the following is the most likely diagnosis?

A	Hyperparathyroidism
B	Monoclonal gammopathy of undetermined significance
C	Multiple myeloma
D	Prostatic carcinoma
E	Waldenström's macrogammaglobulinaemia

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C Multiple myeloma

This man is hypercalcaemic and anaemic. He has a raised IgG level. He is therefore likely to have an IgG paraprotein, which in association with back pain, hypercalcaemia and anaemia, would suggest a diagnosis of myeloma.

A Hyperparathyroidism

Hyperparathyroidism is incorrect. Hyperparathyroidism would not explain the raised IgG level that indicates a probable underlying paraprotein, nor would it explain the anaemia.

B Monoclonal gammopathy of undetermined significance

Monoclonal gammopathy of undetermined significance is incorrect. Monoclonal gammopathy of undetermined significance (MGUS) is associated with no endorgan damage. One would therefore not expect to see anaemia, back pain or hypercalcaemia in MGUS.

D Prostatic carcinoma

Prostatic carcinoma is incorrect. Prostatic carcinoma would be unlikely with a normal PSA level. This would not explain the raised IgG level, which is likely to represent an underlying IgG paraprotein.

E Waldenström's macrogammaglobulinaemia

Waldenström's macrogammaglobulinaemia is incorrect. Waldenström's macrogammaglobulinaemia is associated with an IgM paraprotein, but here the IgM level is normal at just 1.8 g/l. This usually causes lymphadenopathy and anaemia, but is rarely associated with hypercalcaemia or back pain.

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A 62-year-old woman with a platelet count of 1350 × 109/l has been diagnosed with essential thrombocytosis after an exhaustive search failed to reveal any reactive causes for the elevated platelet count. Her platelet count has been greater than 1 million for more than 6 months.

The most appropriate therapy now that a diagnosis of essential thrombocytosis has been established is?

A	Aspirin
B	Aspirin and hydroxycarbamide
C	Clopidogrel
D	Interferon gamma
E	Plateletpheresis

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B	Aspirin and hydroxycarbamide

Aspirin and hydroxycarbamide would be the correct treatment for this patient now that a diagnosis of essential thrombocytosis has been established. Hydroxycarbamide will reduce the platelet count, aiming for a platelet count of less than 400. Aspirin is important to reduce microvascular complications.

A	Aspirin

Aspirin is incorrect. Aspirin alone will clearly not reduce the platelet count, which is definitely required.

C	Clopidogrel

Clopidogrel is incorrect. Clopidogrel alone is false. The platelet count needs to be reduced with a myelosuppressive agent like hydroxycarbamide.

D	Interferon gamma

Interferon gamma is incorrect. Alpha-interferon can be used in essential thrombocytosis, but for a patient of this age, hydroxycarbamide would be the first-line myelosuppressive agent.

E	Plateletpheresis

Plateletpheresis is incorrect. Plateletpheresis is only very occasionally required in the presence of life-threatening thrombotic events when the platelet count needs to be reduced rapidly.

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A 45-year-old lady was found to have a purpuric rash on her legs associated with easy bruising that started after minor trauma. She then presented with an episode of confusion, headache and fatigue, for which she was admitted to hospital for observation. While on the ward she presented a generalised tonic-clonic seizure. On examination, widespread purpura are seen, as well as retinal haemorrhage, and she has a temperature of 38 °C.

The following blood results were obtained:

- White cell count (WCC) 12.7 × 10^9/l
- Red blood cells (RBC) 8.2 × 10^9/l
- Platelets 10 × 10^9/l
- Fragmented red blood cells and increased reticulocyte
- Serum lactate dehydrogenase and bilirubin levels elevated.

What is the most likely diagnosis?

A	Acute myeloblastic leukaemia
B	Aplastic anaemia
C	Autoimmune thrombocytopaenia
D	Myelodysplasia
E	Thrombotic thrombocytopaenic purpura

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B	Aplastic anaemia
C	Autoimmune thrombocytopaenia
D	Myelodysplasia
E	Thrombotic thrombocytopaenic purpura

Explanation

E	Thrombotic thrombocytopaenic purpura

Clinically, this lady has evidence of bruising, purpura, neurological symptoms and fever. In addition, she has fragmented red blood cells, a reticulocytosis and thrombocytopaenia. Her white blood count is normal. Her LDH and bilirubin levels are raised, suggesting some sort of haemolysis. Thrombotic thrombocytopaenic purpura is the only answer that is a haemolytic condition. In this condition there is evidence of a microangiopathic haemolytic anaemia associated with thrombocytopaenia, fevers and neurological symptoms such as fits.

A	Acute myeloblastic leukaemia

Acute myeloblastic leukaemia is incorrect. Acute myeloblastic leukaemia (AML) is false for similar reasons as per myelodysplasia. Infections can be a presenting feature of AML, but seizures are uncommon. The LDH level can be raised due to increased cell turnover, but it is unusual for the bilirubin levels to be raised.

B	Aplastic anaemia

Aplastic anaemia is incorrect. Aplastic anaemia wouldnot present with the l features of neurological symptoms and fever. It a pancytopaenic picture, so there would usually be a

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7:45
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In which part of the cell cycle are cells most resistant to cytotoxic chemotherapy?

A	G_0 phase
B	G_1 phase
C	G_2 phase
D	M phase
E	S phase

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A G_0 phase

The cell cycle is an ordered set of events, culminating in cell growth and division into two daughter cells.

- G_0 phase (resting stage)
  - Cells have not yet started to divide.
  - This step can last for a few hours to a few years.
  - When the cell is signalled to reproduce, it moves into the G_1 phase.
- G_1 phase
  - During this phase, the cell starts making more proteins to get ready to divide.
  - This phase lasts about 20–30 h.
- S phase
  - In S phase, the DNA is copied.
  - This phase lasts about 15–20 h.
- G_2 phase
  - The G_2 phase is just before the cell mitosis.
  - It lasts 2–10 h.
- M phase (mitosis)
  - In this phase, which lasts only 30–60 min, the cell divides.

Many chemotherapy drugs work only on actively reproducing cells (not on cells in the resting phase, G_0). Most chemotherapy agents specifically attack cells in a particular phase of the cell cycle (the M or S phases, for example). This principle is used in combination chemotherapy where drugs that act on different phases of the cell cycle ar bined to maximise the anti-tumour effect. Multiple cycles ment are utilised in chemotherapy regimens in order

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to get ready to divide.
    - This phase lasts about 20–30 h.
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Many chemotherapy drugs work only on actively reproducing cells (not on cells in the resting phase, G_0). Most chemotherapy agents specifically attack cells in a particular phase of the cell cycle (the M or S phases, for example). This principle is used in combination chemotherapy where drugs that act on different phases of the cell cycle are combined to maximise the anti-tumour effect. Multiple cycles of treatment are utilised in chemotherapy regimens in order to maximise the population of cells targeted.

Examples of agents targeting each portion of the cell cycle are as follows: methotrexiate, 5-flurouracil: S phase; bleomycin: G_2 phase; docetaxel: M phase; etoposide: G_1 phase. Other agents (eg cyclophosphamide) are not cell cycle specific and can affect cells at any stage.

Understanding of the cell cycle explains why chemotherapy toxicity mainly affects rapidly growing normal tissues (eg gastrointestinal mucosa, bone marrow) as these are less likely to be in G_0 compared with other tissues.

B	G_1 phase

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orrect. Cells not in the resting phase are more

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G_1 phase is incorrect. Cells not in the resting phase are more susceptible to chemotherapy.

C G_2 phase

G_2 phase is incorrect. Cells not in the resting phase are more susceptible to chemotherapy.

D M phase

M phase is incorrect. Cells not in the resting phase are more susceptible to chemotherapy.

E S phase

S phase is incorrect. Cells not in the resting phase are more susceptible to chemotherapy.

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A 28-year-old patient with thrombotic thrombocytopaenic purpura (TTP) presents with right upper abdominal pain, hepatomegaly and ascites.

Which one of the following is the most likely diagnosis?

A	Budd-Chiari syndrome
B	Gallstones
C	Hepatitis B virus infection
D	Hepatitis C virus infection
E	Pancreatitis

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Previous Question Skip Question

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Explanation

A	Budd-Chiari syndrome

Budd-Chiari syndrome results from obstruction of venous hepatic outflow, andthe most common cause is thrombosis. Clinical signs include abdominal pain, hepatomegalyand ascites.

B	Gallstones

Gallstones is incorrect. Gallstones would not link in with the known diagnosis of TTP which results in thrombosis.

C	Hepatitis B virus infection

Hepatitis B virus infection is incorrect. Hepatitis B infection would not link in with the known diagnosis of TTP which results in thrombosis.

D	Hepatitis C virus infection

Hepatitis C virus infection is incorrect. Hepatitis C infection would not link in with the known diagnosis of TTP which results in thrombosis.

E	Pancreatitis

Pancreatitis is incorrect. Pancreatitis would not link in with the known diagnosis of TTP which results in thrombosis.

45463

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You review a 32-year-old Greek man, who has recently married a woman from the Greek Cypriot community. They are both aware of the risk of thalassaemia that is associated with their genetic heritage and want to find out more about it.

Which one of the following statements fits best with thalassaemia?

A	Blood transfusions should aim to keep the haemoglobin above 9 g/dl
B	Bone marrow transplantation for thalassaemia has a mortality of less than 5% in cases of iron overload
C	Iron replacement therapy is often required
D	It occurs because of an adenine to thymine single-base mutation
E	Thalassaemia occurs because of an imbalance in production of α- and β-globin chains

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E | Thalassaemia occurs because of an imbalance in production of α- and β-globin chains

Normally there is a balanced (1 to 1) production of α- and β-globin chains. In β-thalassaemia, the β-globin chain production is absent or reduced, leading to an excess of α-chains.

A | Blood transfusions should aim to keep the haemoglobin above 9 g/dl

Blood transfusions should aim to keep the haemoglobin above 9 g/dl is incorrect. The haemoglobin should be maintained over 10 g/dl at all times.

B | Bone marrow transplantation for thalassaemia has a mortality of less than 5% in cases of iron overload

Bone marrow transplantation for thalassaemia has a mortality of less than 5% in cases of iron overload is incorrect. The mortality is higher than this, particularly when there is iron overload present.

C | Iron replacement therapy is often required

Iron replacement therapy is often required is incorrect. This is completely false. Patients with β-thalassaemia major are red blood cell dependent, and will rapidly become iron overloaded. Such patients in fact need iron chelation treatment.

D | It occurs because of an adenine to thymine single-base mutation

It occurs because of an adenine to thymine single-base mutation is incorrect. This is the molecular basis of sickle cell anaemia.

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A 60-year-old is taking warfarin longterm for recurrent pulmonary emboli. The patient presents to the Emergency Department complaining of vomiting a large amount of bright red blood. On examination he is pale, hypotensive with a blood pressure of 90/60 mmHg and has epigastric tenderness. Initial blood tests show: Hb 6.5 g/dl, with a normochromic normocytic anaemia; WCC 12.3 × 10^9/l; platelets 375 × 10^9/l and INR 9.2.

How should his coagulation be corrected immediately?

A	Transfusion of 4 units fresh-frozen plasma and 5 mg IV vitamin K
B	Transfusion of 20 units cryoprecipitate and 20 mg IV vitamin K
C	Transfusion of packed red cells
D	Transfusion of prothrombin complex concentrate
E	Transfusion prothrombin complex concentrate with vitamin K

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7:52
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E Transfusion prothrombin complex concentrate with vitamin K

The British Committee for Standards in Haematology is very clear about this, saying that all hospitals should have prothrombin complex concentrate available to be given for warfarin reversal for life-threatening bleeds, which this clearly is. They specifically say that fresh-frozen plasma is inadequate for this reversal. 5–10 mg of vitamin K should be given at the same time. This is very important and should not be overlooked. Prothrombin complex concentrate has only a short life span, so if the vitamin K is not given with the prothrombin complex concentrate, the INR will become elevated once again in 12–24 hours.

A Transfusion of 4 units fresh-frozen plasma and 5 mg IV vitamin K

Transfusion of 4 units fresh-frozen plasma and 5 mg IV vitamin K is incorrect. As outlined, the recommendation from the British Committee for Standards in Haematology is that prothrombin complex concentrate is available to be given for life-threatening bleeds.

B Transfusion of 20 units cryoprecipitate and 20 mg IV vitamin K

Transfusion of 20 units cryoprecipitate and 20 mg IV vitamin K is incorrect. Cryoprecipitate is used when fibrinogen levels are low, which is not the lacking component here.

C Transfusion of packed red cells

Transfusion of packed red cells is incorrect. Although packed red blood cells are an important resuscitation measure, they will clearly not have any impact on his coagulation.

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B	Transfusion of 20 units cryoprecipitate and 20 mg IV vitamin K

Transfusion of 20 units cryoprecipitate and 20 mg IV vitamin K is incorrect. Cryoprecipitate is used when fibrinogen levels are low, which is not the lacking component here.

C	Transfusion of packed red cells

Transfusion of packed red cells is incorrect. Although packed red blood cells are an important resuscitation measure, they will clearly not have any impact on his coagulation.

D	Transfusion of prothrombin complex concentrate

Transfusion of prothrombin complex concentrate (PCC) is incorrect. PCC should be administered with vitamin K due to the short life span of PCC.

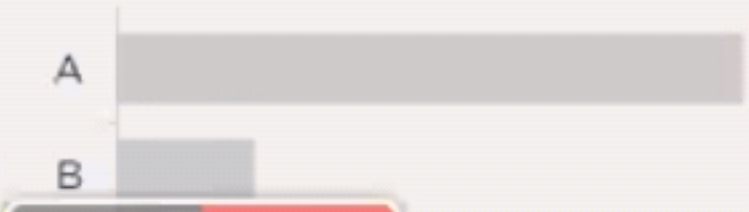
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You review a 54-year-old woman who is anaemic, with raised reticulocyte count and unconjugated bilirubin.

Which one of the following would be considered a more likely cause of microangiopathic haemolytic anaemia in this patient?

A	Cold agglutinin disease
B	Dapsone
C	Hereditary spherocytosis
D	March haemolysis
E	Vasculitis

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Previous Question Skip Question

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Explanation

E Vasculitis

Vasculitis is a cause of microangiopathic haemolytic anaemia.

D March haemolysis

March haemolysis is incorrect. March haemolysis is actually a mechanical cause of haemolysis seen in soldiers who run over large distances.

A Cold agglutinin disease

Cold agglutinin disease is incorrect. Cold agglutinin disease is a form of auto-immune haemolytic anaemia.

B Dapsone

Dapsone is incorrect. Dapsone can cause an oxidative haemolytic anaemia, particularly in patients with glucose 6 phosphate dehydrogenase deficiency.

C Hereditary spherocytosis

Hereditary spherocytosis is incorrect. Hereditary spherocytosis is a congenital cause for haemolytic anaemia.

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A 28-year-old man presents for review. He attended for an insurance medical and the reviewer noticed there was lymphadenopathy on palpation of the neck, axillas and groins. Chest X-ray confirmed the presence of hilar lymphadenopathy. Bone marrow biopsy revealed multinucleated giant cells (Reed-Sternberg cells).

Given the likely diagnosis, which one of the following features would be most consistent with a good prognosis in this condition?

A	Lymphocyte-depleted picture on histology
B	Mixed cellularity picture on histology
C	Presence of night sweats, indicating active immune response
D	Presence of pain on consumption of alcohol
E	Young age

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E	Young age

Presentation at a young age is associated with a better prognosis in patients with Hodgkin's disease.

A	Lymphocyte-depleted picture on histology

Lymphocyte-depleted picture on histology is incorrect. Lymphocyte-depleted histology would be more consistent with an adverse prognosis.

B	Mixed cellularity picture on histology

Mixed cellularity picture on histology is incorrect. Mixed cellularity histology gives an intermediate prognosis, with lymphocyte-predominant histology and nodular sclerosing histology being associated with a better prognosis.

C	Presence of night sweats, indicating active immune response

Presence of night sweats, indicating active immune response is incorrect. Presence of significant night sweats is associated with more widespread disease at presentation, and is associated with a less favourable prognosis.

D	Presence of pain on consumption of alcohol

Presence of pain on consumption of alcohol is incorrect. Presence of pain on consumption of alcohol really is not a prognostic factor, either positive or negative.

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A 34-year-old woman is receiving a cisplatin-based chemotherapy regimen as part of a treatment programme for malignant carcinoma of the ovary. During the consenting process prior to starting chemotherapy she was warned about numerous potential toxicities of the therapy.

Which one of the following is a typical side-effect of cisplatin-based chemotherapy?

A	Excessive hair growth
B	Hypercalcaemia
C	Hypermagnesaemia
D	Optic neuritis
E	Ototoxicity

47365

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E	Ototoxicity

Ototoxicity is an important concern of cisplatin-based chemotherapy and as yet there is no recognised effective treatment for it.

Hypocalcaemia, hypomagnesaemia and hypokalaemia may occur as a result of nephrotoxicity associated with cisplatin.

Nausea and vomiting are often seen, but can be managed with effective antiemetics. Myelosuppression and associated risks of neutropaenic sepsis, anaemia and haemorrhage are also common toxicities.

A	Excessive hair growth

Excessive hair growth is incorrect. Alopecia, rather than excessive hair growth is usually seen.

B	Hypercalcaemia

Hypercalcaemia is incorrect. Hypocalcaemia may occur as a result of nephrotoxicity associated with cisplatin.

C	Hypermagnesaemia

Hypermagnesaemia is incorrect. Hypomagnesaemia may occur as a result of nephrotoxicity associated with cisplatin.

D	Optic neuritis

Optic neuritis is incorrect. Although nerve toxicity is seen, this does not usually take the form of optic neuritis; rather a peripheral sensory neuropathy is more common.

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A 60-year-old patient presents with weight loss and abdominal pain. On examination there is splenomegaly. His lymphocyte count is 5×10^9/l ($(1.0–3.0) \times 10^9$/l). His blood film shows cells that are larger than lymphocytes, without a visible nucleolus and abundant cytoplasm with broad-based projections.

Which one of the following is the most likely diagnosis?

A	Acute lymphocytic leukaemia
B	Acute myeloblastic leukaemia
C	Chronic lymphocytic leukaemia
D	Chronic myeloid leukaemia
E	Hairy cell leukaemia

43666

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Previous Question | Skip Question

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7:58

E Hairy cell leukaemia

This man has splenomegaly with a mild lymphocyte count. The cells are not typical of chronic lymphocytic leukaemia (CLL) because they are larger than normal lymphocytes. They have broad-based projections, which is why this condition is called hairy cell leukaemia. It is a rare form of non-Hodgkin's lymphoma characterised by pancytopenia, splenomegaly and a low monocyte count.

A Acute lymphocytic leukaemia

Acute lymphocytic leukaemia is incorrect. Acute lymphocytic leukaemia is a differential diagnosis but the blood film findings seen here are very typical of hairy cell leukaemia.

B Acute myeloblastic leukaemia

Acute myeloblastic leukaemia (AML) is incorrect. AML would not cause a lymphocytosis.

C Chronic lymphocytic leukaemia

Chronic lymphocytic leukaemia is incorrect. Chronic lymphocytic leukaemia again is another differential diagnosis, but the lymphocytes in CLL are usually the normal-sized lymphocytes that are found in the normal peripheral blood. Again the fact that the lymphocytes have broad-based projections suggests the underlying diagnosis of hairy cell leukaemia.

D Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. Chronic myeloid leukaemia causes a very high white cell count (often greater than 100 or 200 x 10^9/l). It ot cause a lymphocytosis, causing instead a raised neutrophil count and myelocyte population in the blood.

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You are attending a meeting where the introduction of a new screening programme to detect early lung cancer is being discussed.

Which one of the following is the most important criterion when deciding whether such a programme should be introduced?

A	A clinically effective and cost-effective method of early treatment
B	Current technology makes early detection possible
C	The cost per patient found of a screening programme
D	The sensitivity of the test
E	The specificity of the test

45562

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Previous Question | Skip Question

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7:59
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Explanation

A	A clinically effective and cost-effective method of early treatment

The type of screening in this question is concerned with the detection of a disease, in this case lung cancer, at its earliest stage to maximise the possibility of cure. Screening programmes for a particular disease should not necessarily be introduced merely because it is technically possible to detect the condition at an earlier stage – there has to be evidence that early diagnosis will affect the outcome for the patient.

The other answers are all valid aspects that need to be assessed once clinical benefit has been established. The specificity of a test is a measure of its ability to correctly identify healthy people as not having the disease, and therefore a highly specific test would give a low number of false-positives. The sensitivity of a test is a measure of its ability to detect the disease when it is present, and therefore a highly sensitive test would have very few or no missed cases.

Randomised controlled trials are currently being conducted to determine whether improved detection by techniques such as spiral CT will translate into reduced lung cancer mortality rates.

E	The specificity of the test

The specificity of the test is incorrect. As described, the key issue is of improved outcome as a result of early diagnosis.

B	Current technology makes early detection possible

Current technology makes early detection possible is incorrect. As described, the key issue is of improved outcome as a result of early diagnosis.

C	t per patient found of a screening programme

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E The specificity of the test

The specificity of the test is incorrect. As described, the key issue is of improved outcome as a result of early diagnosis.

B Current technology makes early detection possible

Current technology makes early detection possible is incorrect. As described, the key issue is of improved outcome as a result of early diagnosis.

C The cost per patient found of a screening programme

The cost per patient found of a screening programme is incorrect. As described, the key issue is of improved outcome as a result of early diagnosis.

D The sensitivity of the test

The sensitivity of the test is incorrect. As described, the key issue is of improved outcome as a result of early diagnosis.

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A 35-year-old woman presents with extensive bruising on her arms and legs, petechial haemorrhages and bleeding from her gums when she cleans her teeth. She has no significant past medical history of note and takes no medication apart from the oral contraceptive pill. On examination her BP is 115/70 mmHg, pulse is 85 beats/min and regular. She is admitted for observation, and while she is on the ward she suffers a PR bleed of around 120 ml of fresh blood.

Investigations:

Hb	89 g/l
WCC	7.2 x 10^9/l
PLT	42 x 10^9/l
Na^+	140 mmol/l
K^+	4.5 mmol/l
Creatinine	110 µmol/l

Which one of the following is the most appropriate treatment?

A	FFP
B	IV immunoglobulin
C	IV methylprednisolone
D	Oral prednisolone
E	Platelet transfusion

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B IV immunoglobulin

This young woman is thrombocytopaenic. The most likely diagnosis is immune thrombocytopaenia. She has had a PR bleed and now needs a rapid increase in her platelet count to resolve this. Intravenous immunoglobulin will bring about the most rapid improvement in her platelet count.

D Oral prednisolone

Oral prednisolone is incorrect. Oral prednisolone is a possible treatment, but intravenous immunoglobulin will bring about the most rapid improvement in platelet counts.

A FFP

FFP is incorrect. FFP is only used to replace deficient coagulation factors, which is not the casehere.

C IV methylprednisolone

IV methylprednisolone is incorrect. IV methylprednisolone is a possible treatment, but intravenous immunoglobulin will bring about the most rapid improvement in platelet counts.

E Platelet transfusion

Platelet transfusion is incorrect. Platelets have no major role in the treatment of immune thrombocytopaenia, because, once administered, they will be rapidly consumed by the immune system.

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A 19-year-old man presents to the clinic for routine follow-up some 12 months after removal of his spleen after a motorbike accident.

Which of the following would you expect to see on his blood film?

A	Cabot rings
B	Heinz bodies
C	Howell-Jolly bodies
D	Pappenheimer bodies
E	Russell bodies

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8:02
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Your answer was correct

A	Cabot rings
B	Heinz bodies
C	Howell-Jolly bodies
D	Pappenheimer bodies
E	Russell bodies

Explanation

C	Howell-Jolly bodies

Howell-Jolly bodies are basophilic nuclear remnants (clusters of DNA) in circulating red blood cells. These are typical features of the blood film following a splenectomy.

A	Cabot rings

Cabot rings is incorrect. Cabot rings are thought to be the remnants of intracellular microtubules and are seen in megaloblastic anaemia, haemolytic anaemia and lead poisoning.

B	Heinz bodies

Heinz bodies is incorrect. Heinz bodies are seen in haemolytic anaemia, and are inclusion bodies representing denatur aged haemoglobin.

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Video
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8:02
On
738-627-5670

A 55-year-old solicitor with known stomach cancer is admitted with intractable nausea and vomiting. He tells you he is participating in a phase II trial for a new chemotherapeutic agent.

What is the purpose of such a trial?

A	To compare a new drug with the best conventional therapy
B	To determine the long-term toxicity of a drug
C	To establish the anti-tumour activity of a drug
D	To establish the human toxicity of a drug
E	To study the pharmacokinetics of a drug

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Previous Question Skip Question

Calculator

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Annotation Stop Share
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Explanation

C	To establish the anti-tumour activity of a drug

Phase II trials are used to establish the anti-tumour activity of a drug. At the same time, further information on drug toxicity may be gained.

A	To compare a new drug with the best conventional therapy

To compare a new drug with the best conventional therapy is incorrect. Phase III trials compare a new drug with the best conventional therapy and usually require large numbers of consenting patients.

B	To determine the long-term toxicity of a drug

To determine the long-term toxicity of a drug is incorrect. Phase IV studies are used to determine the long-term toxicity of a drug.

D	To establish the human toxicity of a drug

To establish the human toxicity of a drug is incorrect. Phase I trials are used to establish the human toxicity of a drug by delivering carefully selected increased doses to fit patients.

E	To study the pharmacokinetics of a drug

To study the pharmacokinetics of a drug is incorrect. Phase I trials are also used to study the pharmacokinetics of a drug.

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A 32-year-old woman who was investigated for infertility presented with post-operative bleeding from her abdominal wound. Her full blood count (FBC) showed:haemoglobin (Hb) 9.2g/dl, total white cells very high, presence of pro-myelocytes, platelets 32 × 10^9/l, INR was raised to 1.4.

Which one of the following is the next step in management?

A	Give fresh frozen plasma
B	Give hydroxyurea
C	Give interferon alpha
D	Give platelet infusion
E	Give vincristine

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Previous Question | Skip Question

Calculator

Normal Values

Annotation | Stop Share

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D Give platelet infusion

This patient has evidence of acute promyelocytic leukaemia, with circulating promyelocytes, a low platelet count and coagulopathy as shown by a raised INR. The two most important steps in initial management are coagulation support, and rapid diagnostic confirmation. Platelet transfusion should be given to raise the platelet count consistently above 75–100 × 10^9/l.

A Give fresh frozen plasma

Give fresh frozen plasma (FFP) is incorrect. Platelet transfusion should be the first step to raise the platelet count as discussed above, but consideration could be given to FFP if there was ongoing bleeding despite this, especially in the face of a raised INR.

B Give hydroxyurea

Give hydroxyurea is incorrect. Hydroxycarbamide could also be given to reduce the white cell count while the diagnosis is being confirmed, but the most important step in management is correcting the coagulopathy that happens as a result of widespread disseminated intravascular coagulation. If this is not achieved, the patient is at high risk of life-threatening bleeding, such as intracerebral bleeding.

C Give interferon alpha

Give interferon alpha is incorrect. Interferon alpha has no role in acute promyelocytic leukaemia.

E Give vincristine

Give vincristine is incorrect. Again, the most important step in management is aggressive coagulation support.

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#5485

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A 26-year-old man is admitted with a 1-week history of worsening headaches and visual disturbance. Some 6 months ago he completed a course of intensive chemotherapy for widespread advanced testicular cancer. On examination there are visual field abnormalities and papilloedema.

Which one of the following is the most likely cause of his symptoms and signs?

A	Cerebral abscess
B	Late chemotherapy toxicity
C	Paraneoplastic phenomenon
D	Relapse with brain metastases
E	Side-effect of cranial irradiation

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Previous Question | Skip Question

Calculator

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D Relapse with brain metastases

The symptoms and signs are indicative of raised intracranial pressure; given the original advanced nature of the disease, a relapse with brain secondaries seems most likely. If the diagnosis is confirmed on imaging, urgent treatment with steroids should be commenced in order to reduce intracranial pressure, followed by appropriate definitive management (second-line cytotoxic chemotherapy).

A Cerebral abscess

Cerebral abscess is incorrect. A cerebral abscess would be less likely given the timescale, but is an important differential diagnosis.

B Late chemotherapy toxicity

Late chemotherapy toxicity is incorrect. Late chemotherapy neurotoxicity usually manifests as a peripheral neuropathy (with the exception of ototoxicity).

C Paraneoplastic phenomenon

Paraneoplastic phenomenon is incorrect. Neurological paraneoplastic syndromes typically present with encephalitis, cerebellar dysfunction or brainstem dysfunction.

E Side-effect of cranial irradiation

Side-effect of cranial irradiation is incorrect. Cranial irradiation may cause lethargy, alopecia and some long-term cognitive impairment.

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A 76-year-old woman is referred to the Haematology Clinic with tiredness, frequent upper respiratory tract infections and an abnormal white cell count. She has a history of hypertension for which she is treated with indapamide, and asthma managed with Seretide 50, but nil else of note. She looks pale, her BP is 125/80 mmHg, pulse is 90/min and regular. There is generalised lymphadenopathy and splenomegaly. Her BMI is 24. Investigations:

Hb	8.9 g/dl
WCC	102.4 x 10^9/l (predominantly lymphocytes)
PLT	90 x 10^9/l
Na^+	138 mmol/l
K^+	4.3 mmol/l
Creatinine	123 micromol/l
Albumin	36 g/l
ALT	89 U/l

Which of the following is the most appropriate way to diagnose her underlying condition?

A	Bone marrow biopsy
B	Immunoglobulin electrophoresis
C	Lymph node biopsy
D	Peripheral blood immunophenotyping
E	White cell cytogenetics

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D Peripheral blood immunophenotyping

This lady has significant lymphocytosis. The best way of evaluating the nature of this lymphocytosis is by an investigation called immunophenotyping. This is also known as flow cytometry, and looks at the antigens expressed by the lymphocytes. This will give a particular pattern in chronic lymphocytic leukaemia (CLL) and will confirm the diagnosis.

A Bone marrow biopsy

Bone marrow biopsy is incorrect. A bone marrow biopsy is an invasive and painful procedure. Immuno-phenotyping can be done on a simple blood sample, which is clearly much more preferable.

B Immunoglobulin electrophoresis

Immunoglobulin electrophoresis is incorrect. Patients with CLL can have low immunoglobulin levels, but this is not going to be helpful in diagnosing the underlying condition.

C Lymph node biopsy

Lymph node biopsy is incorrect. Lymph node biopsy is an invasive procedure. Taking a simple blood sample to establish the nature of the lymphocytosis will be much easier and quicker.

E White cell cytogenetics

White cell cytogenetics is incorrect. Some patients with CLL can have a deletion in the P53 gene which confers a poor prognosis. However, this therefore gives prognostic information in CLL but is not used to diagnose the actual condition.

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A 47-year-old man presents to the Emergency Department for review between his second and third cycles of chemotherapy for small-cell lung cancer. He says he feels totally washed out and has no energy even to walk a few hundred yards to the local shop. He looks pale, his BP is 122/60 mmHg, pulse is 90/min and regular. He is apyrexial and there are no signs of acute infection. His third cycle of chemotherapy is due to begin in 10 days. Investigations:

Hb	72 g/l
WCC	6.7 x 10^9/l
PLT	102 x 10^9/l
Na+	137 mmol/l
K+	4.2 mmol/l
Creatinine	112 micromol/l

Which of the following is the most appropriate next step?

A	Folic acid
B	Infuse two units of platelets
C	Iron sulfate
D	Take no action
E	Transfuse two units of packed cells

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Explanation

E	Transfuse two units of packed cells

Transfusion of two units of packed red blood cells is the next most appropriate step. He hassymptomatic anaemia that needs a red cell transfusion.

A	Folic acid

Folic acid is incorrect. There is nothing to suggest that he is folate deficient in this question, andgiven his significant symptoms, he would benefit from a blood transfusion.

B	Infuse two units of platelets

Infuse two units of platelets is incorrect. Transfusing two units of platelets would usually only be done if the platelet count was less than 10 in the absence of fevers, or less than 20 × 10^9/l if febrile.

C	Iron sulfate

Iron sulfate is incorrect. This man has significant symptoms that need a blood transfusion.

D	Take no action

Take no action is incorrect. Taking no action is inappropriate, given his significant symptoms of anaemia.

47259

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8:10
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You are reviewing a 35-year-old patient who presented to the Emergency Department with bleeding. His blood picture in the Emergency Department suggested disseminated intravascular coagulation, and unfortunately acute promyelocytic leukaemia (APML) was confirmed soon after his admission. He begins treatment with all-*trans*-retinoic acid (ATRA).

Which one of the following descriptions best fits with the features of ATRA therapy?

A	APML carries a worse prognosis where remission is achieved compared with other types of AML
B	ATRA is usually given as maintenance therapy for 6 months after post-remission therapy is completed
C	ATRA promotes the differentiation of APML cells into mature granulocytes and apoptosis of these cells
D	ATRA should only be used during the acute period of DIC
E	ATRA worsens the DIC picture

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Previous Question | Skip Question

Annotation
Stop Share
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Audio
Video
Share
Participants
More

Explanation

C	ATRA promotes the differentiation of APML cells into mature granulocytes and apoptosis of these cells

The answer is ATRA promotes the differentiation of APML cells into mature granulocytes and apoptosis of these cells. ATRA does promote the differentiation of APML cells into mature granulocytes.This is its mechanism of action.

A	APML carries a worse prognosis where remission is achieved compared with other types of AML

APML carries a worse prognosis where remission is achieved compared with other types of AML is incorrect. APML is an eminently treatable and curable form of leukaemia, especially when the risk of life-threatening haemorrhage has been overcome.

B	ATRA is usually given as maintenance therapy for 6 months after post-remission therapy is completed

ATRA is usually given as maintenance therapy for 6 months after post-remission therapy is completed is incorrect. Recent evidence suggests that this no longer has a role following modern treatment for APML, although this is a little controversial.

D	ATRA should only be used during the acute period of DIC

ATRA should only be used during the acute period of DIC is incorrect. ATRA is used throughout the whole initial period of treatment until remission is achieved, ie normalisation of the bloodcount, with blasts and promyelocytes less than 5% in a post-induction bone marrow.

E	A orsens the DIC picture

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8:13

In terms of screening blood products for infectious agents, pregnant women should receive blood products specifically screened for which organism?

A	Cytomegalovirus
B	Hepatitis B virus
C	Hepatitis C virus
D	Human immunodeficiency virus-2 (HIV-2)
E	*Treponema pallidum*

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Previous Question | Skip Question

Calculator

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8:13
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Explanation

A	Cytomegalovirus

All elective transfusions during pregnancy (not during labour or delivery), should be with CMV IgG negative blood components. CMV negative bloodcomponents are those that are collected from donors who have been tested and found to be negative for CMV IgG antibodies.

B	Hepatitis B virus

Hepatitis B virus is incorrect. All blood products in the UK as specifically screened for hepatitis B.

C	Hepatitis C virus

Hepatitis C virus is incorrect. All blood products in the UK are specifically screened for hepatitis C.

D	Human immunodeficiency virus-2 (HIV-2)

HIV-2 is incorrect. All units of blood collected in the UK are currently routinely tested for HIV-2.

E	*Treponema pallidum*

Treponema pallidum is incorrect. All units collected in the UK are tested for syphilis, caused by the organism Treponema pallidum.

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A 45-year-old patient with recently diagnosed acute myeloblastic leukaemia (AML) presents with right-sided weakness. A CT scan of his brain shows an intracerebral haemorrhage. Routine blood testing shows an Hb of 8.5 g/dl, a white count of 78 $\times 10^9$/l, and a platelet count of 85 $\times 10^9$/l.

Which one of the following is the most likely cause?

A	Anaemia
B	Chemotherapy
C	Disseminated intravascular coagulation
D	Hyperleukocytosis
E	Metastases

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Previous Question | Skip Question

Calculator

Normal Values

Annotation | Stop Share

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Explanation

D Hyperleukocytosis

This man with newly diagnosed AML has a very high white cell count. His platelet count is reduced but not dramatically. He now has a right-sided weakness, so hyperleukocytosis is the most likely cause of his intracerebral haemorrhage. Patients with AML who present with a high white cell count need urgent chemotherapy to reduce the count, as well as aggressive support of any abnormal coagulation. Once an intracerebral bleed has been identified, the platelet count should be raised to greater than 100 $\times 10^9$/l, as well as aggressive support of abnormal coagulation.

C Disseminated intravascular coagulation

Disseminated intravascular coagulation is incorrect. Disseminated intravascular coagulation (DIC) is possible, but this is not the most likely cause, as there is no other evidence to suggest DIC such as abnormal coagulation results.

A Anaemia

Anaemia is incorrect. This would not result in an intracerebral haemorrhage.

B Chemotherapy

Chemotherapy is incorrect. This will not result in the clinical presentation described in the question.

E Metastases

Metasta ncorrect. There is nothing to suggest a solid tumour t tasised to the brain in this situation.

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intravascular coagulation (DIC) is possible, but this is not the most likely cause, as there is no other evidence to suggest DIC such as abnormal coagulation results.

A	Anaemia

Anaemia is incorrect. This would not result in an intracerebral haemorrhage.

B	Chemotherapy

Chemotherapy is incorrect. This will not result in the clinical presentation described in the question.

E	Metastases

Metastases is incorrect. There is nothing to suggest a solid tumour that has metastasised to the brain in this situation.

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A patient who takes warfarin for atrial fibrillation presents with a single episode of melaena. The INR is measured at 7.9. His Hb is noted to be 9.3 g/dl. The patient is otherwise well and haemodynamically stable.

In addition to omitting warfarin, what is the most important therapeutic intervention?

A	Platelet infusion
B	Vitamin B12 injection
C	Vitamin K infusion
D	Antithrombin III infusion
E	Fibrinogen substitution

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Previous Question | Skip Question

Calculator

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C	Vitamin K infusion

This man is warfarinised for atrial fibrillation and has had a single episode of melaena. Although he is a little bit anaemic, he is otherwise well and haemodynamically stable. The warfarin should be stopped, and vitamin K given intravenously. If he was haemodynamically unstable, the patient should receive prothrombin complex concentrate.

A	Platelet infusion

Platelet infusion is incorrect. This man is over anticoagulated with warfarin, and it is the correction of the coagulation problem that is required. It is highly likely that this man's platelet count is normal.

B	Vitamin B12 injection

Vitamin B12 injection is incorrect. This of course will have no impact on reversing this man's warfarin.

D	Antithrombin III infusion

Antithrombin III infusion is incorrect. The correct method of reversing warfarin is using vitamin K.

E	Fibrinogen substitution

Fibrinogen substitution is incorrect. The correct method of reversing warfarin is using vitamin K.

41785

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A 22-year-old woman presents to the haematology clinic with a history of menorrhagia. Apparently her mother and sister suffered from the same problem and her brother suffered bleeding for a prolonged period after a wisdom tooth extraction. On examination she looks well, her BP is 122/72 mmHg, pulse is 70/min and regular and her BMI is 22. Investigations:

Hb	124 g/l
WCC	7.3 x 10^9/l
PLT	202 x 10^9/l
Na^+	137 mmol/l
K^+	4.1 mmol/l
Creatinine	100 µmol/l
PT	12.1 s
APTT	42.3 s

Which of the following is the most likely diagnosis?

A	Haemophilia A
B	Haemophilia B
C	DIC
D	Vitamin K deficiency
E	von Willebrand's disease

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D	Vitamin K deficiency
E	von Willebrand's disease

Explanation

E	von Willebrand's disease

This lady has a normal blood count. She has a family history of coagulation bleeding disorders, particularly after dental extraction. The prothrombin time is normal, with a slightly increased PTT. This would therefore suggest a diagnosis of von Willebrand's disease. Note that the majority of patients with von Willebrand's disease have a normal PTT.

A	Haemophilia A

Haemophilia A is incorrect. Haemophilia A only affects males.

B	Haemophilia B

Haemophilia B is incorrect. Haemophilia B only affects males.

C	DIC

DIC is incorrect. DIC is an acute coagulation disorder in response to another stimulus, and thisis not the clinical situation in this question.

D	Vitamin K deficiency

Vitamin K deficiency is incorrect. Vitamin K deficiency would result in a prolonged prothrombin time much more than a prolonged PTT. There is a hereditary component to this question, given the fact that woman's mother, brother and sister suffered from the same problem.

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Which one of the following is least characteristic of idiopathic myelofibrosis?

A	Extensive bone marrow sclerosis
B	Leukoerythroblastic picture
C	Splenomegaly
D	Teardrop-shaped red blood cells
E	Terminal conversion to multiple myeloma

#7215

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Previous Question | Skip Question

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8:18
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Explanation

E	Terminal conversion to multiple myeloma

Terminal conversion to multiple myeloma is the least characteristic. This does not occur with idiopathic myelofibrosis.There is no connection between myeloma and idiopathic myelofibrosis. Myelofibrosis can change to acute myeloid leukaemia.

A	Extensive bone marrow sclerosis

Extensive bone marrow sclerosis is incorrect. Extensive bone marrow sclerosis is a feature of myelofibrosis, with excessive fibroblast proliferation and collagen deposition in the bone marrow.

B	Leukoerythroblastic picture

Leukoerythroblastic picture is incorrect. Leucoerythroblastic blood picture is characteristic of myelofibrosis so would not be an appropriate choice here.

C	Splenomegaly

Splenomegaly is incorrect. Massive splenomegaly is a typical feature of myelofibrosis so would not be an appropriate choice here.

D	Teardrop-shaped red blood cells

Teardrop-shaped red blood cells is incorrect. Teardrop-shaped red blood cells is a characteristic blood film finding in myelofibrosis.

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Video
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Participants
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A 72-year-old woman presents to the Gastroenterology Clinic for review. She has suffered from paroxysms of abdominal pain, diarrhoea and flushing over the past 6 months, and has lost 6 kg in weight. On examination her BP is 105/70 mmHg, pulse is 80/min and regular. She has a systolic murmur, her chest is clear, abdomen is soft and non-tender, and she has a BMI of 21.

Investigations:

Hb	10.1 g/dl
WCC	9.2 x 10^9/l
PLT	171 x 10^9/l
Na^+	138 mmol/l
K^+	3.4 mmol/l
Creatinine	113 µmol/l
Alanine aminotransferase (ALT)	142 u/l
Alkalin Phosphatase	185 u/l
Abdominal USS	Multiple lesions in the liver consistent with metastases
Urine 5-HIAA	65 pmol/24 hours

What is the intervention of choice for controlling her symptoms?

A	Conventional chemotherapy
B	eptadine

Investigations:

Hb	10.1 g/dl
WCC	9.2 x 10^9/l
PLT	171 x 10^9/l
Na^+	138 mmol/l
K^+	3.4 mmol/l
Creatinine	113 µmol/l
Alanine aminotransferase (ALT)	142 u/l
Alkalin Phosphatase	185 u/l
Abdominal USS	Multiple lesions in the liver consistent with metastases
Urine 5-HIAA	65 pmol/24 hours

What is the intervention of choice for controlling her symptoms?

A	Conventional chemotherapy
B	Cyproheptadine
C	Interferon-α
D	Methysergide
E	Octreotide

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Octreotide is a long-acting somatostatin analogue which blocks release of 5-HT, and probably also reduces tissue sensitivity to 5-HT in target tissues. For patients with unresectable carcinoid, the diagnosis here, it is the intervention of choice for symptom relief.

A Conventional chemotherapy

Conventional chemotherapy is incorrect. Mid-gut carcinoid tumours (the likely primary source here) are poorly responsive to conventional chemotherapy, although new regimens including combination therapy with capecitabine and temozolamide are useful in some patients.

B Cyproheptadine

Cyproheptadine is incorrect. Other hormone antagonists including cyproheptadine, clonidine and methysergide may be useful in patients who fail to respond to octreotide alone.

C Interferon-α

Interferon-α is incorrect. Interferon-α is effective at controlling symptoms (and may have an antitumour effect) in some patients; this is thought to be due to modulation of the host immune response to the carcinoid tumours.

D Methysergide

Methysergide is incorrect. Although restricted for use in other conditions such as migraine because of risk of retroperitoneal fibrosis, use of methysergide can be useful in metastatic carcinoid where symptoms are resistant to octreotide alone.

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A 72-year-old woman presents with worsening back pain. She also feels generally weak. An X-ray of her back shows multiple vertebral collapses and lytic lesions. In addition she has had an episode of shingles over the last 6 months.

What is the next investigation to confirm the most likely diagnosis?

A	Bone biopsy
B	CT scan
C	Magnetic resonance imaging
D	Muscle biopsy
E	Serum electrophoresis

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Previous Question Skip Question

Calculator

Normal Values

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E Serum electrophoresis

The next investigation that would likely confirm the diagnosis is the one that can be most easily performed. Immunoglobulin levels and serum electrophoresis would be the next investigation here. This is the most easily performed investigation.

A Bone biopsy

Bone biopsy is incorrect. Bone biopsy is a very invasive test that is not usually required. A bone marrow examination, however, would be an important investigation – but evaluation of immunoglobulin levels, identification of a paraprotein through serum electrophoresis and examining serum free light chains would be more important.

B CT scan

CT scan is incorrect. A CT scan is not going to be helpful here. A CT scan can be important in helping to evaluate soft tissue plasmacytomas, but in general, MRI scanning is more useful. It should be noted, however, that neither of these imaging modalities will answer the question and confirm the most likely diagnosis of myeloma.

C Magnetic resonance imaging

Magnetic resonance imaging (MRI) is incorrect. MRI is going to be important to make sure that this lady does not have any evidence of cord compression. It will also delineate the extent of bony disease in much more detail. However, it is not going to help confirm the likely diagnosis of myeloma.

D Muscle biopsy

Muscle biopsy is incorrect. Muscle biopsy has got nothing to do with the likely diagnosis of myeloma.

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8:21
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A 18-year-old Italian woman presents with anaemia. Haemoglobin is 70 g/l (120–160 g/l). Her blood film shows marked hypochromia and variation in cell shape and size. Nucleated red cells are also found.

Which one of the following is the most likely diagnosis?

A	Acute myeloblastic leukaemia
B	Aplastic anaemia
C	Chronic myeloid leukaemia
D	Sickle-cell anaemia
E	Thalassaemia

43708

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Previous Question | Skip Question

Calculator

Normal Values

Annotation
Stop Share
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Audio
Video
Share
Participants
More

Which one of the following is the most likely diagnosis?

Your answer was correct

A	Acute myeloblastic leukaemia
B	Aplastic anaemia
C	Chronic myeloid leukaemia
D	Sickle-cell anaemia
E	Thalassaemia

Explanation

E	Thalassaemia

This young woman's Italian origin is very important. She has a marked hypochromia, ie a reduction in the amount of haemoglobin in each red blood cell. This is called a low MCH. Congenital disorders always need to be considered in young patients, whereas congenital disorders presenting in older patients are obviously much rarer. This is a typical presentation of thalassaemia in an Italian girl, and nucleated red blood cells are usually found in the peripheral blood.

A	Acute myeloblastic leukaemia

Acute myeloblastic leukaemia (AML) is incorrect. AML is a rare leukaemia in children and young adults. It also does not suggest a pancytopenia in this problem, but rather an isolated anaemia.

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marked hypochromia, ie a reduction in the amount of haemoglobin in each red blood cell. This is called a low MCH. Congenital disorders always need to be considered in young patients, whereas congenital disorders presenting in older patients are obviously much rarer. This is a typical presentation of thalassaemia in an Italian girl, and nucleated red blood cells are usually found in the peripheral blood.

A Acute myeloblastic leukaemia

Acute myeloblastic leukaemia (AML) is incorrect. AML is a rare leukaemia in children and young adults. It also does not suggest a pancytopenia in this problem, but rather an isolated anaemia.

B Aplastic anaemia

Aplastic anaemia is incorrect. The fact that the marrow is not working would not lead to nucleated red blood cells in the peripheral blood. We are not told the white cell count or the platelet count, but it sounds like an isolated anaemia as well, which would be unusual in aplastic anaemia. As discussed above, aplastic anaemia is usually an acquired problem, and has no specific ethnicity links.

C Chronic myeloid leukaemia

Chronic myeloid leukaemia is incorrect. Chronic myeloid leukaemia again is very rare in young children and adolescents. Although it can cause a slight anaemia, the predominant finding is a marked elevation in the peripheral blood of neutrophils and myelocytes. This certainly is not the presentation as outlined in the information given.

D Sickle-cell anaemia

Sickle-c mia is incorrect. Sickle-cell anaemia is possible, but does not cause a significant hypochromia. Sickle-cell anaemia

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A 40-year-old man had a right hemicolectomy for a Dukes C colorectal adenocarcinoma. A complete excision was achieved and he received 6 months of adjuvant chemotherapy treatment.

During his routine follow-up what is the most appropriate tumour marker that should be looked for in addition to regular radiological surveillance?

A	AFP
B	CA19-9
C	CEA
D	PSA
E	Urinary 5HIAA

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Previous Question | Skip Question

Calculator

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8:23
٠٩:٢٣

CEA (carcinoembryonic antigen) is the most reliable tumour marker for the detection of colorectal carcinoma and is routinely used in the post surgical follow-up; it can also be helpful in tumour diagnosis. It may also less commonly be elevated in other gastrointestinal malignancies, as well as some non-neoplastic conditions such as inflammatory bowel disease. Therefore it is not sufficiently specific to be utilised as a screening tool.

A	AFP

AFP is incorrect. AFP is elevated in non-seminomatous germ cell tumours and hepatocellular carcinoma.

B	CA19-9

CA19-9 is incorrect. CA19-9 is a carbohydrate cell surface antigen that can be elevated in colorectal carcinoma but is less sensitive than CEA – it is often elevated in tumours of the pancreas and gallbladder and other gastrointestinal tumours.

D	PSA

PSA is incorrect. PSA is a marker for prostate cancer.

E	Urinary 5HIAA

Urinary 5HIAA is incorrect. Urinary 5HIAA is elevated in some neuroendocrine (carcinoid tumours).

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8:23
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A 35-year-old man had an extensive DVT 3 weeks after fracturing his femur. Now, 1 year later, and when he has been off anticoagulants for 6 months, he is planning to fly from the UK to Australia. He is a smoker and his mother had a DVT following the birth of her second child. He is referred for consideration of management of the trip. On investigation his full blood picture and coagulation screen is normal. However, his thrombophilia screen is as follows:

Protein C	0.8 IU/ml (normal range 0.7–1.40 IU/ml)
Protein S	0.92 IU/ml (normal range 0.6–1.40 IU/ml)
Antithrombin III	1.1 IU/ml (normal range 0.8–1.20 IU/ml)
lupus	anticoagulant-negative
APC resistance	1.9 (normal > 2.2 negative)
heterozygous	1.64+/–0.11
homozygous	1.26+/–0.01)
factor V	Leiden-positive

You decide that he should be given subcutaneous heparin prophylaxis to cover the long-haul flight.

Which one of the following is the most important reason for making this decision?

A	He is at high risk because of his previous history of a DVT
B	He may have an occult carcinoma
C	He smokes 10 cigarettes/day
D	His positive family history of thrombosis
E	Presence of factor V Leiden mutation

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A	He is at high risk because of his previous history of a DVT

This man has had an extensive DVT which was provoked after a fracture of his femur. He is now planning to go on a long-haul flight to Australia. He is at higher risk simply because of his previous history of a provoked DVT.

E	Presence of factor V Leiden mutation

Presence of factor V Leiden mutation is incorrect. We are told that he is factor V Leiden positive, but it is not stated whether he is homozygous or heterozygous for this mutation. Assuming that he is heterozygous, this again does not influence clinical decisions around thrombo-prophylaxis, and the fact that he has had a previous significant DVT is a much more important fact.

B	He may have an occult carcinoma

He may have an occult carcinoma is incorrect. There is no suggestion of this in the question.

C	He smokes 10 cigarettes/day

He smokes 10 cigarettes/day is incorrect. Prophylactic anticoagulation would not be given just because he is a smoker.

D	His positive family history of thrombosis

His positive family history of thrombosis is incorrect. The fact that he has had a positive family history of thrombosis is of lesser importance to his own personal history of a significant DVT.

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A 28-year-old woman is 24 days post-allogeneic bone marrow transplantation (D+24) for relapsed acute myeloid leukaemia using an unrelated donor. Investigations:

Hb	8.4 g/dl
WBC	1.2 x 10^9/l
Neutrophils	0.8 x 10^9/l
PLT	16 x 10^9/l

She is febrile at 37.5°C with a widespread macular rash that extends from the palms and soles to involve the trunk and lower extremities. For the last 36 hours she has had profuse diarrhoea with some mixed blood.

Which one of the following is the most likely diagnosis?

A	Acute graft rejection
B	Acute graft-versus-host disease
C	Cytomegalovirus infection
D	Delayed haemolytic transfusion reaction
E	Thrombotic thrombocytopaenic purpura

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Question 43 of 50

B	Acute graft-versus-host disease

The onset of acute graft-versus-host disease is in the first 100 days post-transplant. Acute graft-versus-host disease typically causes a skin rash that in particular starts on the palms and soles. There is also associated diarrhoea and jaundice. This is a significant problem, and may result in widespread fluid loss from the bowel. It is more common after unrelated donor transplantation, than after a sibling allogeneic donor transplant. This is treated with immunosuppression, starting with high-dose steroids.

A	Acute graft rejection

Acute graft rejection is incorrect. Acute graft rejection would cause an ongoing pancytopenia, but the patient is only 24 days following the transplant, and there does appear to be neutrophil engraftment, with neutrophils of 0.8 × 10^9/l. The graft rejection would not be associated with the profuse diarrhoea that is typical of acute graft-versus-host disease.

C	Cytomegalovirus infection

Cytomegalovirus infection is incorrect. Cytomegalovirus infection is usually an asymptomatic infection that is detected by rising PCR transcript levels in the post-transplant setting. The combination of the widespread macular rash and diarrhoea is much more compatible with acute graft-versus-host disease.

D	Delayed haemolytic transfusion reaction

Delayed haemolytic transfusion reaction is incorrect. A delayed haemolytic transfusion reaction would not result in the profuse diarrhoea and the widespread macular rash.

E	Thrombotic thrombocytopaenic purpura

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ombocytopaenic purpura is incorrect. Thrombotic

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A 55-year-old woman has been complaining of itching (especially in the warm), headache, dizziness and tiredness for the last 2 years. On examination she is slightly cyanosed and has splenomegaly. The following laboratory parameters are obtained: Hb 18g/dl; haematocrit 0.58; erythrocytes 6.8×10^{12}/litre; leukocytes 17×10^{9}/litre; platelets 395×10^{9}/litre.

Which one of the following is the most likely diagnosis?

A	Secondary erythrocytosis
B	Polycythaemia rubra vera
C	Hairy cell leukaemia
D	Brain tumour with paraneoplastic ACTH secretion
E	Waldenström's macroglobulinaemia

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Previous Question Skip Question

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B	Polycythaemia rubra vera

The woman has a raised haemoglobin, raised haematocrit with a raised white cell count. She also has splenomegaly. This all therefore suggests a primary myeloproliferative disorder in the form of polycythaemia rubra vera. 95% of such patients have a mutation in the JAK2 gene.

A	Secondary erythrocytosis

Secondary erythrocytosis is incorrect. This would not explain the splenomegaly and the symptoms of itching, which are classical of primary polycythaemia.

C	Hairy cell leukaemia

Hairy cell leukaemia is incorrect. Hairy cell leukaemia will not cause a polycythaemic state.

D	Brain tumour with paraneoplastic ACTH secretion

Brain tumour with paraneoplastic ACTH secretion is incorrect. Brain cell tumour with paraneoplastic ACTH secretion has got nothing to do with polycythaemia.

E	Waldenström's macroglobulinaemia

Waldenström's macroglobulinaemia is incorrect. Waldenström's macroglobulinaemia is a lymphoid malignancy associated with an IgM paraprotein. It has nothing to do with red blood cells.

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A 20-year-old woman has a long history of seronegative arthritis. She has been in hospital for 2 weeks with a painful swollen knee and pyrexia. Treatment with broad-spectrum antibiotics is ongoing, but a progressive deterioration of blood counts is noted. You are asked for advice on management when her full blood count is as follows:

Hb	10.5 g/dl (11.5–16.5)
WCC	1.5 × 10^9/l ((4–11) × 10^9)
Neutrophils	0.2 × 10^9/l ((1.5–7.0) × 10^9)
Platelets	130 × 10^9/l ((150–400) × 10^9)

Which haemopoietic growth factor is most likely to lead to improvement in her neutrophil count?

A	Erythropoietin
B	G-CSF
C	IL-3
D	SCF (stem-cell factor)
E	Thrombopoietin

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B	G-CSF

G-CSF is the growth factor that is most likely to lead to an improvement in her neutrophil count. This stands for granulocyte-colony stimulating factor. This is routinely given after intensive chemotherapy for acute leukaemia and following stem-cell transplants. It can be given in other situations, such as auto-immune neutropenia, when it is necessary to raise the neutrophil count and there is associated sepsis.

A	Erythropoietin

Erythropoietin is incorrect. This stimulates red blood cell production.

C	IL-3

IL-3 is incorrect. This stimulates the differentiation of multi-potent haemopoetic stem cells into myeloid progenitor cells. It is also not routinely available, unlike G-CSF which is routinely available in the clinical situation.

D	SCF (stem-cell factor)

Stem-cell factor is incorrect. As the term suggests, it plays an important role in the regulation of haemopoetic stem cells in the bone marrow.

E	Thrombopoietin

Thrombopoietin is incorrect. This stimulates platelet production.

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A 65-year-old patient has noticed worsening tiredness, weight loss and shortness of breath over the last 6 months. Lymphadenopathy and splenomegaly are present. His peripheral lymphocyte count is $60 \times 10^9/l$ ($(1.0–3.0) \times 10^9/l$).

Which one of the following is the most appropriate next step in obtaining the diagnosis?

A	Abdominal ultrasound
B	Blood smear examination with immunophenotyping
C	Bone marrow biopsy
D	CT abdomen
E	Lymph node biopsy

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It is necessary to characterise the nature of the lymphocytes. This is done using a process called immunophenotyping, which looks at the different patterns of markers of proteins on the surface of the lymphocytes. Chronic lymphocytic leukaemia (CLL) has a very particular profile of antigens on the surface of the lymphocytes which allow the diagnosis to be made without the need for a bone marrow examination. This would therefore certainly be the first step in attaining the diagnosis. The word 'appropriate' is very important here. This is because it is the least invasive way of trying to understand the nature of the lymphocytosis.

A Abdominal ultrasound

Abdominal ultrasound is incorrect. Although this might delineate further the extent of the lymphadenopathy, it would not help in obtaining a diagnosis.

C Bone marrow biopsy

Bone marrow biopsy is incorrect. Bone marrow biopsy is not the most appropriate next step in obtaining the diagnosis because it is more invasive than taking a simple blood sample for immunophenotyping. Note that immunophenotyping is also termed 'flow cytometry'.

D CT abdomen

CT abdomen is incorrect. Although this might delineate the extent of the lymphadenopathy further, it would not help in obtaining a diagnosis.

E Lymph node biopsy

Lymph [illegible]opsy is incorrect. This would not be required as we know th[illegible]man has a peripheral blood lymphocytosis. Immunophenotyping can characterise these further, but if that did

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A 65-year-old man is admitted on the 'medical take' with recurrent pyrexia. He has a long history of arthritis. On examination positive findings include changes in his hands consistent with chronic arthritis, a temperature of 38.5°C, coarse crepitations at his lung bases and a 2-cm splenomegaly. His blood count is as follows:

Hb 11.3 g/dl, with a normochromic, normocytic picture, WCC 2.1 × 10^9/l, neutrophils 0.3 × 10^9/l, platelets 142 × 10^9/l.

Which one of the following is the diagnosis?

A	Curran syndrome
B	De Grouchy syndrome
C	Di George syndrome
D	Felty syndrome
E	Kostmann syndrome

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Previous Question Skip Question

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Explanation

D	Felty syndrome

This man has a significant neutropenia in the background setting of chronic arthritis. He also has associated splenomegaly. Felty's syndrome is used to describe the triad of rheumatoid arthritis with splenomegaly and neutropenia.

A	Curran syndrome

Curran syndrome is incorrect. This is a rare disorder characterised by the association of kidney, hand and foot abnormalities.

B	De Grouchy syndrome

De Grouchy syndrome is incorrect. This is also known as 18q deletion syndrome and essentially causes problems from childbirth.

C	Di George syndrome

Di George syndrome is incorrect. Di George syndrome is a genetic disorder that can cause heart defects, learning difficulties, a cleft palate and problems with development of the thymus gland.

E	Kostmann syndrome

Kostmann's syndrome is incorrect. Kostmann's syndrome causes severe congenital neutropenia.

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A 37-year-old woman presents with increased bruising. She feels that the bruises appearing on her arms and legs have only been associated with relatively minor trauma, but she 'looks like she has been beaten up'. On examination she has extensive bruising on her arms and legs. Her BP is stable at 128/74 mmHg, her pulse is 65 bpm, and there are no other abnormal findings.

Investigations:

Hb	129 g/l
WCC	7.8 x 10^9/l
PLT	33 x 10^9/l
Na^+	139 mmol/l
K^+	4.6 mmol/l
Creatinine	110 µmol/l
APPT	30s
INR	1.1

Which one of the following is the most like diagnosis?

A	Anticoagulant abuse
B	Haemophilia B
C	Idiopathic thrombocytopaenic purpura
D	Thrombotic thrombocytopaenic purpura
E	von Willebrand's disease

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C Idiopathic thrombocytopaenic purpura

This lady has a relatively normal haemoglobin and white cell count, but a significant thrombocytopaenia. She appears otherwise well. This would therefore be consistent with ITP.

E von Willebrand's disease

von Willebrand's disease is incorrect. von Willebrand's can prolong the APTT, which is not the case here. It is usually associated with a normal platelet count. The only exception to this is that there is a rare form of von Willebrand's disease called form 2A, which can be associated with athrombocytopaenia. However, ITP is a much more likely diagnosis in this young woman.

A Anticoagulant abuse

Anticoagulant abuse is incorrect. Anticoagulant abuse would prolong the INR but would have no impact on the platelet count, so this is false.

B Haemophilia B

Haemophilia B is incorrect. Haemophilia B only occurs in male patients as it is X-linked. This would not affect the platelet count and would prolong the APTT.

D Thrombotic thrombocytopaenic purpura

Thrombotic thrombocytopaenic purpura (TTP) is incorrect. There are no clinical features such as cerebral or renal involvement to suggest this diagnosis. This is a microangiopathic haemolytic anaemia, and, in this patient, there is no anaemia. Patients with TTP are usu unwell, which is not the clinical scenario presented here.

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Which one of the following is the most likely cause of pancytopaenia in a patient treated for inflammatory bowel disease?

A	Azathioprine
B	Mesalazine
C	Methotrexate
D	Metronidazole
E	Prednisolone

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In a patient that is treated for inflammatory bowel disease, this cytotoxic agent can certainly cause a pancytopaenia. Patients need to report any symptoms that may suggest this, such as bleeding or infections, and regular blood counts should be undertaken while on this medication.

C Methotrexate

Methotrexate is incorrect. Methotrexate can be associated with cytopaenias, especially if taken in excessive doses. Azathioprine, however, is a more likely cause of pancytopaenia.

B Mesalazine

Mesalazine is incorrect. Mesalazine is not usually associated with pancytopaenia.

D Metronidazole

Metronidazole is incorrect. Metronidazole is not a common cause of pancytopaenia.

E Prednisolone

Prednisolone is incorrect. Prednisolone is not associated with cytopaenias.

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A 22-year-old woman presents to the haematology clinic for review. She has a history of a previous deep vein thrombosis and her mother has recently been diagnosed with protein-C deficiency. There is also history of a miscarriage at 12 weeks some 18 months earlier.

Which one of the following is the best test to detect protein-C deficiency?

A	APTT
B	Copperhead snake venom assay
C	Protein-S level
D	PT
E	Von Willebrand factor level

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Explanation

B Copperhead snake venom assay

This will activate protein C to produce activated protein C. This can then be measured in a chromogenic reaction, to quantify the level of protein C in this patient.

D PT

Prothrombin time is incorrect. Prothrombin time, like the APTT, will be very non-specific.

A APTT

APTT is incorrect. APTT is not the best way to detect protein-C deficiency, it will be very non-specific.

C Protein-S level

Protein-S level is incorrect. Protein-S level is not the best way to detect protein-C deficiency, and is clearly false.

E Von Willebrand factor level

Von Willebrand factor level is incorrect. Von Willebrand factor level has nothing to do with protein-C deficiency, and is therefore false.

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